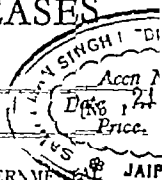




# TROPICAL DISEASES BULLETIN

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LEAGUE OF NATIONS INTERGOVERNMENTAL  
CONFERENCE OF FAR EASTERN COUNTRIES ON RURAL  
HYGIENE

Report by the Preparatory Committee. (C.H. 1234) (Ser. L.o.N.P. 1937 III 3) [2s 6d]

*Preparatory Papers National Reports*

Report of French Indo-China. (C.H. 1235) (Ser. L.o.N.P. 1937 III 4) [3s]

Note on Public Health Organisation in Burma. Note on Medical Organisation in Burma. (C.H. 1235 (a)) (Ser. L.o.N.P. 1937 III 5) [1s 3d]

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Report of Siam. (C.H. 1235 (h)) (Ser. L.o.N.P. 1937 III 13) [1s 3d]

I. A Brief Report on Rural Hygiene in the Colony of Hong Kong, II. Memorandum on Conditions Prevailing in North Borneo, III. Note on the Medical and Health Services in Sarawak, IV. Memorandum Concerning the Colony of Fiji, V. Memorandum on Public Health Organisations of the Gilbert and Ellice Islands Colony, VI. Note on the Health Organisation of the British Solomon Islands Protectorate, VII. Report for the New Hebrides Condominium, VIII. Report for Tonga. (C.H. 1235 (i)) (Ser. L.o.N.P. 1937 III 14) [3s]

Report of the Netherlands Indies. (C.H. 1235 (j)) (Ser. L.o.N.P. 1937 III 15) [5s]

With a view to preparing for an Inter-governmental Conference on Rural Hygiene convened by the League of Nations at Bandoeng

(Netherlands Indies) on August 3rd 1937 the various countries invited to send representatives to the Conference were asked to communicate a national report covering the items of the agenda of the Conference which were as follows —

- I — Health and Medical Services
- II — Rural Reconstruction and Collaboration of the Population.
- III — Sanitation and Sanitary Engineering.
- IV — Nutrition
- V — Measures for combating certain diseases in Rural Districts.

In addition a Preparatory Committee consisting of Mr A. S. Haynes, Professor de Langen and Dr E. J. Pampana, visited India, Burma, Siam, Malaya, Indo-China, the Philippines, Netherlands East Indies, and Ceylon and issued a report which is a preliminary study of the problems of rural medicine and hygiene in these countries (see *Bull of Hyg* 1937 Vol 12 p 465)

Many of these reports are important and detailed. It is impossible to do justice to them in brief abstracts and they should be read in full by all who are interested in health conditions in the territories in question.

### *French Indo-China*

Except in the larger centres medical and general health work are combined in a single service. Traditional medicine, Cambodian or Sino-Annamite retains the confidence of the vast majority of the people and there can be no question of its prohibition.

The medical staff consists of European doctors, mostly civilians, and an Indo-Chinese body, the majority of whom are Annamites. There is a Medical School at Hanoi which until recently trained students for a local diploma. Owing to the extension of secondary education this school has now been converted into a Higher School of Medicine in which students can qualify for a State diploma of the same standard as the French faculties. The policy is gradually to replace Europeans by locally trained doctors. The latter have shown some reluctance to settle in rural areas but it is hoped to overcome this by the payment of subsidies. The tendency to overcrowding of the medical profession in the towns may help in the same direction.

In the past it was only possible to train local midwives, whose standard of education was poor but there is now a State midwifery diploma and fully trained midwives will gradually take the place of the lower grades.

Sick attendants for rural areas will be recruited in their own villages. Local nurses inspire confidence where a stranger would meet with distrust.

The medical service is based on a provincial organisation. There is a Hospital in the chief town of each province and this is linked up with field ambulances and rural infirmaries. The provincial medical service is responsible for vaccination, inoculation against cholera and typhoid and the administration of B.C.G. which is given at all the maternity hospitals. Action is also taken against malaria, trachoma, water-borne disease, and leprosy.

Health education is provided for by the medical inspection of schools and school buildings and lectures to teachers and children. Outside the schools, health propaganda is conducted among the mutual education societies and native officials. The rural population is more

difficult to reach. Rural sick attendants while on tour prepare health record-cards of the villages for the use of the Medical Officers. Posters and pamphlets are issued to hospitals and schools and disseminated in rural areas. Co-operation with the native administrations and with the Education P.W.D. and Veterinary Service is essential.

Tables are given to show the allocation of medical and health expenditure and the proportion it bears to the total of the budgets. The average total health expenditure per head is 0.391 piastre (1 Indo-Chinese piastre = 10 French francs). The native pays a personal tax of from 2.25 to about 5.50 piastres per annum and this tax is paid by about one-fifth of the population. At least one third of the personal tax is thus returned to the taxpayer in the form of medical and health benefits.

Rural reconstruction is encouraged by education and propaganda and by practical schemes of flood protection irrigation and drainage.

Details are given of different types of housing which varies a good deal according to social status and locality. Old superstitions are sometimes in opposition to hygienic principles. For example walls must not be pierced with windows as windows afford openings for the penetration of evil spirits who dare not use the main gate which is reserved for the gods.

Village water supplies are often grossly contaminated, but fortunately the water is usually drunk in the form of tea. The Annamite knows how to clarify water by the use of alum. Rain water is preferred above all.

In providing water-supplies for the larger centres the traditional means of purifying water adopted in France was at first followed but these were soon abandoned in favour of new methods adapted to local conditions. It was found for instance that special plant was needed to deal with water containing large quantities of colloidal matter. With modern methods of purification river water is usually the most suitable source of supply. There are certain areas in which for a short period in the dry season the natural water supplies are *brackish*. *In such cases water is collected in reservoirs dug in the ground near a river filling being usually by gravity.*

A simple and effective method of water purification has been designed which is suitable for rural communities. It consists of a sedimentation chamber filter and tank. After being treated with alum in the sedimentation chamber the water is passed through a filter consisting of a layer about one metre thick of crushed granite gravel of a fineness of from 2 to 4 millimetres and is chlorinated in the tank. The whole plant can be looked after by a mechanic and a turncock. There is close co-operation between the P.W.D. and the water laboratories of the Pasteur Institutes.

Hygienic methods for the disposal of refuse and excreta are difficult to introduce because domestic manure is used as the chief fertiliser. Improvement will depend on more rational methods of farming. In the meantime every effort is made to protect the sources of drinking-water from faecal contamination.

No general measures of fly control have been undertaken but efforts have been made in limited areas. A simple type of manure pit is described.

Rice is the staple food. Its cultivation and treatment differ according to whether it is to be used for local domestic consumption or for export. Maize is also widely used. Soya bean rich in protein



and fat is an admirable supplement to a rice diet. Meat where eaten is usually in the form of pork but fish fresh or preserved is universally eaten. The traditional meal consists of rice vegetables fish eggs, meat or fowl.

Tables are given to show the chemical constitution and value of the principal foodstuffs and the caloric requirements are discussed in relation to the amount of manual work performed. Diet scales are given for soldiers prisoners hospital patients and school-children. The minimum cost of adequate nutrition is considered and it is pointed out that poverty is the main cause of dietetic deficiencies.

Beriberi is the most common deficiency disease ranking eighth among diseases treated in hospitals. In addition to measures to discourage the consumption of mechanically husked rice a more varied and balanced diet is needed, which must be sought by the cultivation of secondary crops and a general raising of the standard of living. This leads on to the question of giving the peasant greater purchasing power by increasing the yield and quality of his crops and by the introduction of new ones. Every effort is being made to encourage fisheries. The schools have an important part to play by spreading practical knowledge and influencing the minds of the people.

Malaria is the disease of greatest economic and social importance. It furnishes the largest number of hospital cases and of deaths in health institutions. The usual measures against individual infection are described and in discussing antilarval activities reference is made to the value as larvicides of certain waste products such as the discharge from the latex treatment process of rubber waste-oil from combustion engines and coal waste containing traces of sulphur. Rice fields can be treated by alternate irrigation and drainage.

Syris is prevalent in certain provinces and is usually treated by a course of from six to ten injections of bismuth salicylate lasting one month followed in many cases by a second period of treatment. It is claimed that this method is most successful and that there have been no ill-effects when large doses are given.

Leprosy.—The last attempt at a census gave a total figure of 12 000 lepers in a population of some 29 millions, but this is believed to be an under-estimate. There are about 5 000 lepers in colonies controlled either by the Administration direct or by subsidized missionary organizations. The treatment of lepers as out patients at leprosy clinics has not been a success, and it is clear that home segregation is only suitable for the rare cases in the well-to-do. Apart from the present system of voluntary segregation an improvement in the general standard of living is the main hope for the future.

Trachoma.—It is stated that there are at least five million people suffering from trachoma. It is most prevalent on or near the coast. Contagious forms of the disease are most prevalent in young children and contamination occurs in early infancy through infected linen. In the rural areas preventive measures are carried out at the infirmaries and by the travelling medical and auxiliary staff.

Cholera.—Cholera is not endemic in Indo-China but there have been many serious epidemics, believed to have been of foreign origin. Preventive measures have consisted mainly of a sustained effort to improve water supplies, and large scale vaccination.

The report is illustrated with photographs of housing, waterworks rural industries, etc. and there are maps showing the distribution of malaria and the work of the Anti-Malaria Survey.

*Burma*

There is a separate service of public health under a Director of Public Health whose department comes under the Ministry of Education and Public Health. There are a few whole time health officers but in most districts the civil surgeons are also responsible for the health work. Sub-assistant surgeons are employed on sanitary and epidemic duties. The municipalities employ a large number of public health inspectors. For port health duties a whole-time staff is employed in Rangoon and part time staff in other ports.

In 1934-35 local authorities expended about 17 per cent. of their income on public health services. Active support has been received from the Burma branch of the Indian Red Cross Society and in many places there are voluntary infant welfare societies maintaining themselves by means of local contributions.

The basis of all preventive work in the country is education and propaganda. Rangoon City has held Health Week Exhibitions for many years and in 1935 this exhibition was awarded the Bostock Hill Memorial Shield in competition with other parts of the Empire.

There is no Government midwifery service but midwives are employed by the municipalities and district councils.

Registration of vital statistics is in force for about 12 million out of a population of 14½ million.

There is an interesting account of a rural health unit established at Hlegu 30 miles from Rangoon in 1929 with the assistance of the Rockefeller Foundation. A complete public health service was set up which included the collection of vital statistics, health education, vaccination, school medical inspection, maternity and child welfare work, control of infectious diseases, refuse and sewage disposal, improvement of water supplies and abatement of nuisances. In addition to its value as a model of public health activities in a rural area this unit has been a useful field training centre for public health personnel.

Bored-hole latrines have gone a long way towards solving the problem of the disposal of human excreta in rural areas and their adoption is being actively encouraged.

The erection of fly proof market stalls for the sale of meat and fish has been abandoned as impracticable but efforts are made to provide buildings which by the nature of their construction discourage flies.

*Beriberi* is not endemic nor is it epidemic to any extent but outbreaks sometimes occur in small communities living under special conditions. The deterioration of rice from damp or moulds was noted as an important factor in certain outbreaks which were investigated. The diet of the average Burman is rich and varied. *Gout* is widely prevalent in certain areas especially in some of the hill tracts.

*Malaria* is endemic throughout Burma and it is dealt with by the Malaria Bureau of the Harcourt Butler Institute of Public Health, Rangoon. In the plains where there is extensive cultivation of rice, malaria vectors are practically absent apart from certain irrigated areas but it is prevalent sometimes in epidemic form in hilly districts. Quinine or cinchona febrifuge are distributed either for free issue where authorized or on payment.

Epidemics of *cholera* occur from time to time. The population has learnt to appreciate the value of preventive measures especially inoculation.

The control of *plague* which is endemic, and frequently epidemic, in many towns and districts is a serious problem. Cyanogas has been found most useful in dealing with burrowing rats but most important is the need for better general sanitation especially in and around markets.

*Leprosy* presents a serious problem. In areas which have been surveyed the rate is about 16 per 1 000. There are nine clinics for the treatment of leprosy and colonies have been established by the Government and by a Roman Catholic Mission.

The Harcourt Butler Institute of Public Health Rangoon opened in 1927 provides a training-school for sanitary personnel, medical students and school teachers, a laboratory for public health work and a centre for propaganda.

The report concludes with a note on Medical Organisation in Burma by Colonel N. S. Sodhi I.M.S.

#### *British India.*

A note on the Central Government's Health Organization and Associated Institutes and Organizations connected with Public Health.

By the Government of India Act 1919 medical and public health administration were for the most part transferred to provincial governments. Under the new Constitution which was brought into force from 1st April, 1937 the position in regard to medicine and public health has not materially changed. The Federal Legislature retains the power to make laws with respect to such matters as the health of cantonments, central institutes for medical and public health research, the census, supervision over the health of emigrants and immigrants and the health conditions under which pilgrims proceed to places beyond India, port quarantine and the control of port health in the major ports, health and quarantine in relation to air traffic, and the regulation of conditions of labour and safety in mines and oilfields.

The Central Medical and Public Health Department of the Government of India deals with different departments according to the subject under reference.

The Director-General of the Indian Medical Service is the head of the technical department and on the civil side, is adviser to the Government of India on all questions of a medical nature.

The Public Health Commissioner with the Government of India is the adviser of the Government on all public health matters and corresponds direct with the departments concerned, but he also acts as staff officer for public health to the Director-General. He advises local governments and provincial Directors of Public Health when asked to do so.

The collection of vital statistics in rural areas is carried out mainly by the village headmen. The chief vital statistics for British India in 1934 were as follows —

Birth-rate, 33.7

Death rate 24.8.

Infant mortality 187 (rate per 1,000 births)

The Government of India have recently constituted a Central Advisory Board of Health to ensure co-operation between the centre and the provinces and between individual provinces in matters of health which are of common concern.

The only laboratory under the control of the Central Government is the Central Research Institute at Kasauli [The research work of this laboratory is well known to all workers in tropical medicine] The serum and vaccine section of the Institute manufactures prophylactic vaccines other than plague vaccine for the whole of India.

There are six Pasteur Institutes in India maintained either by local governments or by the Pasteur Institute Association. The tendency nowadays is to decentralize treatment by issuing vaccine to local treatment centres. Out of 44,963 persons treated in 1934-35 99.65 per cent. were classified as successful 0.16 as failures and there were 0.35 per cent. of deaths.

The Indian Research Fund Association which corresponds roughly with the Medical Research Council in England has for its object the prosecution of research into medical problems and experimental research generally in connection with the causation mode of spread and prevention of disease.

It depends primarily on funds provided by the Government of India and it has an annual budget of from £50,000 to £90,000. Work is now in progress on malaria cholera plague kala azar and maternal mortality and morbidity. The report of the Kala Azar Commission and the nutrition researches of Sir Robert McCarrison are outstanding examples of what has been achieved.

After the war the need for a central malaria organization became apparent and this led to the formation of the Malaria Survey of India which is financed by the Indian Research Fund Association. The Malaria Survey advises the Government on all issues relative to malaria conducts systematic research and epidemiological investigations advises upon and assists in carrying out anti malaria measures undertakes clinical work, including treatment and holds courses of training for medical and public health officers. In addition to its headquarters at the Central Research Institute Kasauli a field experimental station is maintained.

The All India Institute of Hygiene and Public Health opened at Calcutta in 1932 with the aid of funds provided by the Rockefeller Foundation has six sections (1) Public Health administration (2) Malariology and Rural Hygiene (3) Epidemiology and Vital Statistics (4) Nutrition and Bio-Chemistry (5) Sanitary Engineering (6) Maternity and Child Welfare.

The functions of the medical and public health organization of the Government of India are chiefly advisory but it is also indirectly concerned with curative and preventive activities in Delhi Province and a number of smaller areas.

Details are given of medical relief institutions in British India in 1934 and it is stated that excluding Delhi Province there were 4,251 hospitals and dispensaries which gives an average of one institution for every 58,000 persons living in rural areas. Of these institutions 84 per cent. were maintained either by Government or by local bodies and the remainder by private organizations such as missionary societies. But even now dispensary treatment is not within easy reach of many of the rural villages. Efforts are being made to induce private medical practitioners by means of Government subsidies to settle in rural tracts.

There is no large scale organization of medical women in India and the work of the Women's Medical Service with a cadre of only forty-two is confined almost exclusively to urban centres.

There are very few nurses in the rural areas of India. This is partly due to the fact that rural institutions are intended primarily for out patients and secondly the nursing profession is held in low esteem and few Indian women are prepared to take it up as a career. Midwifery in rural areas is still largely in the hands of the untrained *dais*.

The Government of India has recently made grants to provincial governments to be spent on schemes for economic development and improvement of rural areas. These include amongst sanitary measures anti-malarial schemes village water supplies and sanitation, including drainage.

In an appendix to this report Colonel R. N. Chopra gives an account of the School of Tropical Medicine Calcutta.

### *Malaya.*

There are separate services closely related and co-ordinated for curative medicine and public health.

There is a Medical College at Singapore which provides a complete medical curriculum on the same lines as the medical schools of Great Britain. Graduates are granted a diploma—the Licentiate of Medicine and Surgery Singapore.

There are 179 locally qualified doctors in Government service. They are employed in all Government hospitals and are placed in charge of the smaller district hospitals and various outdoor dispensaries and clinics. Their work is mainly curative, but in certain cases they also undertake health work.

Student sanitary inspectors, Government and private have the opportunity of taking a course of training for the certificate of the Royal Sanitary Institute the examination for which is held locally once a year.

Hygiene and sanitation are taught in all schools and the teachers are expected to apply the principles taught practically in their own homes and in the schools.

Modern methods of transport have made it possible to provide one large hospital in each settlement or State and to use the old district hospitals as outdoor dispensaries and collecting stations for the main hospitals.

The Public Health Service which covers a wide field is split up into regional divisions in which are situated health units and centres.

There is a school medical service which aims at the payment of two visits a year by a doctor to each assisted school. The purpose of the first visit is to inspect the buildings and make a medical examination of all the children referring them for treatment if necessary. The second visit is to note how far recommendations have been followed and treatment carried out.

Expenditure on medical and health services in 1935 was about 9 per cent. of the total expenditure on all departments.

The collaboration of the population in matters of rural hygiene is fostered by travelling dispensaries, infant welfare centres, films on such subjects as infant welfare tuberculosis, and malaria, exhibitions and clinics also through the teaching of hygiene in schools, and through the co-operative societies. The rate of progress depends largely on the personality and keenness of the teachers and it is important that they should belong to the same race as the people they teach.

Subsoil water from anti malaria drains is made available for bathing and washing clothes. The consumption of raw river water is discouraged by the erection of experimental purification plant but unless the supplies are easy of access the people will not use them.

In rural areas properly constructed latrines are rare but tube latrines may help to solve the problem.

The house-fly is not a serious problem in Malaya.

Sufficient information is available about the composition and value of the common foodstuffs. Here as elsewhere the quality of the diet depends largely on the spending power of the individual. Polished rice and dried fish are the basis of some of the poorer diets. Government rice mills provide an unpolished rice. School gardens are almost universal. The use of fresh milk is encouraged but so far there has not been much demand for it.

*Malaria* being one of the major public health problems the main activities of the Health Service are directed against it. Drainage methods may be surface subsoil or tidal—permanent or temporary. The usual temporary measures such as oiling and the application of Paris green are employed together with various hydro-technical methods such as flushing and sluicing of hill-streams. Quinine is distributed free at vernacular schools police stations and health centres. The average Malay has no liking for mosquito-nets and prefers the repellent effect of the smoke of burning coconut husks to protect him while he sleeps.

Although *plague* has existed among the rat population for thirty years there has been a very low incidence of human plague. Apart from rat-catching in the ports no special measures have been taken.

Compulsory legislation is in force against *leprosy*, and there are five leper settlements three in the Straits Settlements one in the Federated Malay States and one in Johore.

### *Ceylon*

An introduction to this report describes the physical features climate and political constitution of the island.

The health and medical services are vested in a Ministry of Health, which controls the following services —

- (a) Medical and Sanitary
- (b) Board of Quarantine
- (c) The Medical College.
- (d) The College of Indigenous Medicine.

A public health branch of the service was created in 1913 and under the present system medical officers may be employed either on the medical or public health side. In the district work of the past attention was paid mainly to environment and the control of epidemics. More recently health units have been established and the medical officers of health conduct ante-natal and infant welfare centres, carry out medical inspection of school children and give mass treatment for hookworm and malaria and preventive inoculations. Curative work is financed by the central Government while local preventive work is a charge on the area concerned.

The training of doctors is carried out at the Ceylon Medical College which is maintained by the Government. The College grants a licence in Medicine Surgery and Midwifery which is registrable in Great Britain. From twelve to twenty medical students pass out each year.

A Ministry of Health now known as the National Health Administration was formed soon after the National Government was established at Nanking in 1928.

Nine out of the eighteen provinces now have provincial health administrations and there are over 200 rural health units. In a country with such diverse customs and traditions uniformity of administration is impossible and methods must be governed by local conditions. There is, however, a standard type of health organization which is being applied to as many districts as possible. The unit is the *hsien* (district or county) and there should be a *hsien* health centre with a full-time health officer and public health nurses and midwives. Under the health centre there is a health station staffed by a health officer and a nurse. Under the supervision of the health station there are sub-stations, commonly located in schools, run usually by a woman nurse with midwifery and public health training. Finally there are village health workers, laymen who have received a short period of training in reporting births and deaths, vaccination and simple sanitation.

Such vital statistics as are obtained are collected by the police. So far this system has reached only the marketing towns, and even in cities and district towns little reliable information is available. According to rural field workers the crude birth rate is about 30 per mille, crude death rate about 25, infant mortality about 200 and maternal mortality about 10. Apart from endemic diseases the chief causes of mortality are gastro-intestinal infections, tuberculosis, tetanus, neonatorum, smallpox, diphtheria, and acute exanthemata.

Even in the most developed districts old-style practitioners still attend over 65 per cent. of the population, while about 28 per cent. die without receiving any treatment at all.

Although vaccination was introduced into China more than a hundred years ago, smallpox continues as a chief cause of mortality.

It is difficult to effect any improvement in maternal and child health in rural districts. Midwifery is in the hands of completely untrained women and attempts to improve the standards if these old-style midwives have not been successful. Trained midwives are expensive and are often unwilling to live under rural conditions.

An important experiment in rural sanitation was started in 1935 in the Kiang Ning Hsien south of Nanking, an area of some 940 square miles. The aim of the scheme is threefold:

- (1) to provide a field laboratory for training health workers
- (2) to provide field facilities for studying rural sanitary problems
- (3) to promote the welfare of the farmers by improving their sanitary conditions in such respects as housing, water supply and disposal of excreta and refuse.

Chinese diet, while adequate in caloric value, shows a preponderance of cereals but is deficient in animal food and in milk and dairy produce. It is therefore low in vitamin A and calcium. Rice is the staple food in South China and wheat in North China.

Deficiency diseases are very prevalent. *Acropelhelminia* is common among factory workers and soldiers. *Rickets* and *osteomalacia* are commonly met with at the clinic of the Peiping Union Medical College. *Beriberi* is prevalent in South China where polished rice is the staple food. *Scurvy* and *pellagra* are comparatively rare.

**Malaria**—A review of the malaria situation in China by Faust in 1926 showed (1) complete absence of endemic malaria in the north west (2) severe infection in the lower Yangtze valley and along the south east coast reaching its saturation point in Formosa Hainan and Tonkin (3) heavy infection in south western Yunnan and the Upper Yangtze Valley (4) relatively little malaria in Manchuria and Hunan Province. During the past ten years there have been two considerable epidemics in the lower Yangtze Valley the first after the flood in 1931 the second in the autumn of 1936. There have also been a number of epidemics of minor importance. The wider distribution is due largely to movements of troops while natural causes such as floods and famine have played a part by lowering individual resistance.

Over 95 per cent of the malaria in China occurs in rural districts especially in the rice-growing areas. Owing to the lack of a modern irrigation system farmers keep the water continuously in the fields. Drainage of the fields at regular intervals and improved methods of storage of water would reduce mosquito-breeding considerably.

**Plague**—An account is given of outbreaks occurring in many districts of China in recent times and in an appendix details are given of an anti-plague campaign in the town of Lungyen in 1935.

**Leprosy**—In China as elsewhere leprosy is a disease of rural areas. The report contains a map showing leper areas together with the hospitals and clinics. It is estimated that the total leper population of China is about a million mostly in the villages. This being the case village clinics are more likely to benefit the sufferers than leprosaria situated in the towns and attention is now being devoted to an extension of these clinics including mobile units.

The report is illustrated by a series of photographs depicting housing sanitary structures anti plague work and other public health activities.

### *Japan*

General public health is administered by the Central Sanitary Bureau of the Department of Home Affairs which is divided into four sections dealing respectively with—

- (1) Health preservation
- (2) Chronic diseases prevention
- (3) Acute infectious diseases prevention.
- (4) Medical.

There is a number of advisory councils all of which are under the supervision of the Minister of Home Affairs. Locally public health administration is apparently controlled mainly by the Chiefs of the Police. In localities where there is a dearth of private practitioners the Government has organized a service of doctors for emergency or regular visits. In some cases doctors are subsidized by Government.

In 1934 the health budget of the Central Sanitary Bureau was 15.64 per cent of that of the whole Ministry.

Health unions co-operate with the authorities to take action in health matters and co-operative societies take an active part in the establishment of rural dispensaries and hospitals and in rural rehabilitation.

Most of the towns and urban districts are provided with proper water supplies. In rural districts the quality of drinking water is generally good and the supply abundant.

Most of the refuse in rural districts is used as fertilizer by the farmers or as fuel. To prevent danger from the use of night soil farmers are



advised to adopt the "sanitary privy" and build night-soil storage tanks on the farms to ensure complete decomposition. The effluent from this privy is considered to be free from the danger of both parasitic and infectious diseases. [There is a plan of this privy which is really a tank latrine.]

Rice is of course the most important item in Japanese diet. Experiments made at the Government Institute of Nutrition have proved that rice hulled to the extent of seven-tenths is the healthiest and most economical.

*Plague*—Apart from a few cases in the cities of Osaka, Kobe and Yokohama Japan has been free from plague in recent years.

The death rate per 10,000 of the population for all forms of tuberculosis in 1934 was 19.3 for pulmonary tuberculosis 14.2 and for other forms 5.1. The death-rate in rural areas has shown a relative decline during the past ten years. Measures taken by the Government include an increase in the number of sanatoria, provision of anti-tuberculosis centres and national propaganda.

There were 15,183 lepers in Japan in 1935. There is accommodation for 7,000 in existing leprosaria and it is expected that within three years there will be provision for all cases whose isolation is considered necessary and that in ten years thereafter leprosy will have disappeared from the country.

### Siam.

A Department of Public Health was instituted in 1918 to organize and control both preventive and curative medicine in the country. Decentralization is encouraged but until fully qualified personnel is available the class of work handed over must be limited to their capacity. The central administration provides technical assistance and advice. "Public health work is only effective with the full co-operation of the local inhabitants, and the creation of local responsibility is an important means towards that end."

It is considered that in Siam preventive and curative medicine should be under a single central control.

The country is split up into four health divisions, each with first-grade hospital and training centre for subordinate health staff. There will be a Health Board for each province and rural health centres are being developed. The present type of untrained communal healers will be replaced gradually by trained assistants.

There are at present only some 500 qualified medical men and women to serve a population of over thirteen millions. The training of auxiliary staff will not be difficult as secondary education is sufficiently advanced to provide suitable recruits in adequate number.

Co-operative credit societies are likely to play an important part in promoting economic progress. Improved road communications are essential to public health progress.

The difficulties of rural sanitation in Siam are economic and are not due to religious practice or national habits. In rural districts water is obtained from rivers or from shallow wells. During the dry months riparian populations are liable to epidemics of Cholera. At such times temporary water supplies are organized alum and chloride of lime being employed. Public wells are useful but hand-pumps soon get out of order. Rain water is collected in all available jars and tanks [Siam is fortunate in being free from the menace of yellow fever]

Rural economic surveys have shown that nutrition problems are urgent. Polished rice is largely consumed and there is a tendency to use salted and pickled rather than fresh fish. Little use is made of the local livestock for food although plenty is available.

*Malaria* presents a serious problem with nearly 35 000 deaths per annum in a population of some thirteen millions. It occurs chiefly in the hilly districts of the north and south. It is proposed to employ four survey units, one for each division of the country, with a central laboratory in the capital. In the meantime large scale treatment is needed and the Government is assisting by distributing quinine free or at less than cost price.

*Tuberculosis* is fairly prevalent in Siam and the statistics show over ten thousand deaths a year. It is more common in urban centres than in rural districts. An Anti Tuberculosis Association has been formed and a centre is being set up in Bangkok for free examination and treatment.

*Leprosy*.—A survey has shown 16,893 lepers fairly evenly distributed throughout the country. Both the Government and certain missionary bodies maintain leper colonies but more are needed. At present a good deal of domiciliary treatment is carried out.

### *Hong Kong*

The territory of Hong Kong consists of the island of Hong Kong itself with the peninsula of Kowloon and a leased area known as the New Territories. It is situated just within the northern limit of the tropics. Population is about 1 000 000. The health and medical services are in the hands of a single Director.

The territories are divided into two medical districts in charge of Chinese Medical Officers. There are a number of fully equipped dispensaries and one mobile dispensary staffed by nurse midwives and dressers. These dispensaries provide a complete medical service including infant welfare, school medical work and venereal disease treatment and propaganda. The St John Ambulance Association has also established dressing-centres and dispensaries.

The chief vectors of malaria are *A. minimus* and *A. jayporensis* breeding at the foot of hills or valleys.

The report is illustrated with photographs.

### *North Borneo*

Medical and health work are carried out by the same staff. Difficulties of transport render the establishment of a central hospital impossible but there is a system of dispensaries under the charge of Chinese or native dressers and closer contact is made with the natives in their own villages by touring dressers.

School gardens are being opened at all vernacular schools to teach the children how to grow the right kinds of crops. The staple diet is whole rice or tapioca and beriberi is seldom seen. There is endemic goitre in some of the villages.

*Malaria* is hyperendemic. Treatment with quinine is given at the dispensaries and by touring officers.

### *Sarawak*

Medical and health work are carried out by the same staff. Most of the population live in towns on the sea-coast or on the banks of rivers. There are effective health organizations. There are few roads and communication is mainly by water.

The headquarters of medical and health work is in the town of Kuching, with a population of 30,000. There is a well-equipped hospital of 300 beds. Special attention is paid to midwifery and the number of confinements in this hospital has risen from 15 in 1927 to 300 in 1936.

There are dressing-posts throughout the country and the dressers also receive training in health matters.

The use of N A B for yaws has done much to gain the confidence of the people in Western medicine.

### *Fiji*

There are about 150 inhabited islands in the Fiji group with a total population of roughly 200,000. Fijians form about half of these and the remainder are mostly Indians. For the Fijians there is a medical organization which includes native medical practitioners, with provincial hospitals and dispensaries at convenient points. In addition to Government medical officers of the Colonial Medical Service there are local medical practitioners trained in the Central Medical School at Suva.

In 1935 9.2 per cent. of the Government revenue was devoted to medical and health services.

Fiji is entirely free from malaria. *Ankylostomiasis* formerly a disease of great importance has been brought under control and the same may be said of yaws.

There has been a Medical School in Fiji for about 50 years and it is recorded that the first eight students qualified as native medical practitioners in 1889. In 1928, with financial assistance from the International Health Board of the Rockefeller Foundation this school was enlarged and was re-opened with forty students as the Central Medical School. Arrangements were made to take students from other Pacific administrations. Up to the end of 1936 185 medical practitioners had graduated from the Central Medical School. The course is one of four years. The aim of the school is to fit its graduates for the normal responsibilities of medical practitioners and health officers without removing them from their native environment. They are competent to deal with ordinary epidemics, carry out mass treatment and conduct preventive measures, such as soil sanitation and infant welfare.

### *Gilbert and Ellice Islands*

The health and medical services provide treatment for the whole population and conduct campaigns against such diseases as yaws and hookworm. There are two main hospitals and on each of the 25 islands of the group there is a hospital of native construction with one or more native dressers in charge.

### *British Solomon Islands*

This is a group of volcanic islands situated from 5° to 12°30' south of the equator. There is a population of about 94,000, entirely rural in character. Medical and health work are carried out by the same staff. The Protectorate is co-operating in the schemes for training native practitioners in the Central Medical School at Suva, Fiji, and it is hoped eventually to employ about twenty graduates from this school.

The Medical Service normally maintains a vessel in which a travelling medical officer visits the districts to keep in touch with the work of the native medical practitioners and carry on health propaganda.

Mass treatment of *ankylostomiasis* and yaws has resulted in a great improvement in the health of the population in recent years.

#### *Report of the New Hebrides Condominium*

(Prepared jointly by the British and French Authorities.)

There are strictly speaking no health or medical services financed and controlled by the Condominium Government but there exist the following medical services.

(a) *The French Medical Service*—This service is financed and controlled by the French Government. Its objects are to provide medical treatment both for non-natives and natives at certain centres and to protect the health of labourers on French plantations.

(b) *Presbyterian Mission Medical Service*

(c) *Melanesian Mission Medical Service*—The two latter services are intended primarily for natives but non natives are treated in urgent cases.

(d) *Condominium Medical Service*—This consists of certain members of the French National Medical Service and mission doctors in the group.

Curative activities consist mainly of the treatment of cases brought to the medical centres. It has not been possible to undertake properly planned campaigns against the chief native diseases yaws and malaria.

#### *Tonga*

The Kingdom of Tonga consists of three main groups of islands and certain outlying islands between 18° and 22° South Latitude. Population is about 32,000. Medical and health work are carried out by the same staff. The medical service is based on a central hospital in the main groups with outlying dispensaries.

The standard of life and education is comparatively high for a native people. Infant welfare and ante-natal clinics have been started at the hospitals with encouraging results. Food is plentiful and dietetic deficiencies are attributable to ignorance rather than poverty.

*Tuberculosis* is a serious problem. Out of 203 deaths in patients treated by the Medical Service in 1935 57 were from tuberculosis.

*Filaria* and *elephantiasis* are present throughout the Kingdom.

#### *Netherlands Indies.*

This immense group of islands covers an area 3 000 miles from west to east and 1,200 miles from north to south. The population is approximately 65 millions, of which about 42 millions live in Java, where there is great density of population (314 per square kilometre). It is essentially a rural population. Politically the Netherlands Indies is part of the kingdom of the Netherlands. Part of it is self-administering.

The Public Health Service comes under the Department of Education and Public Worship. Hitherto entirely centralized a beginning has been made with decentralization. The policy of the Central Government is to hand over curative activities to private initiative and local authorities and enable the health service to devote its main energies to preventive work and the education of the people in health matters. The entire organization is however supervised by one Director.

Medical training was first begun in Batavia in 1851 and there is a School of Medicine which gives a Netherlands Indian diploma regarded as equivalent to the Netherlands diploma. There is now a second school at Sourabaya. In this school more stress is laid upon the practical rather than the purely scientific side.

The report describes fully the training of the various groups of auxiliary personnel. As in some other tropical possessions there are two grades of midwife—the thoroughly trained, few in number whose education and training has been fairly long and expensive and simply trained helpers inexpensive and available in considerable numbers.

An important part in preventive work is played by the Pasteur Institute at Bandoeng. All vaccines and sera for the whole country are prepared there. A new process of preparing vaccine lymph by preservation *in vacuo* has been devised. Such vaccine will remain potent for years in a tropical climate and has been given good results even in the most remote districts.

A small demonstration health service was established at Poerwokerto in 1933. In this unit medical and subordinate personnel are trained in the technique of health organization. It has been found here that house-to-house visits by trained health workers are the best means of obtaining the co-operation of the native population, and that practical demonstrations and cinema films are of more value than public lectures.

The percentage of the country's entire budget expended for public health was 2.75 in 1936.

Rice is of course one of the most important staple foods but maize, cassava, sweet potatoes and sago are also largely consumed. The increased planting of soya beans is an important means of supplementing the staple foods. As in other tropical countries the use of animal products is very limited and most of it is consumed at feasts.

A number of diseases common in temperate climates, such as nephritis, diabetes mellitus, hypertension and chronic rheumatism are seldom seen amongst the agricultural classes in the Netherlands Indies though they are far from rare in natives who eat large quantities of fat and protein. Beriberi is still a potential danger especially in town dwellers. The Government combats beriberi successfully by encouraging the growing of leguminous plants by distributing half polished rice and by controlling the dietary of estate labourers. *Xerophthalmia* is met with in many places and it is not improbable that a hypovitaminous A is very common.

Good work is being done by the Institute for Nutrition Research founded in 1934 in co-operation with agricultural and horticultural experts. The ordinary native diet while probably adequate in quantity is lacking in variety. Propaganda is needed to encourage a diet which is as varied as possible and the use of more animal products.

*Malaria* is found to a greater or less extent in every island of the archipelago. Investigation has shown that while there are thirteen known vectors of malaria in the Netherlands Indies only one species of anopheline *A. indonesiensis* which breeds almost exclusively in brackish-water zones is constantly dangerous. In 1924 a Central Malaria Bureau was founded as a subdivision of the Public Health Service and later a Bureau at Sourabaya. A large number of malaria assistants have been trained in these bureaux.

The mortality from malaria is higher in the towns than in the rural districts. It causes a decline in the population in the case of endemic

malaria this is due to a high infant mortality while in that of epidemic malaria it is the result of interrupted pregnancies

Anti-malarial engineering work has been carried out chiefly in the principal coastal towns while in the rural districts there has been systematic distribution of quinine. Rice-fields and salt water fishponds have been dealt with by periodical drying-out the latter being stocked with the larvivorous *H. panchax*. Various estates in Java have been protected against *A. maculatus* by shading. It is considered that such biological methods must come first in controlling malaria in rural districts.

**Plague**—Java has for many years suffered severely from plague. The actual plague area lies now for the most part in West Java. Between 1911 and the end of 1936 there were 207 666 registered deaths from plague in Java. It is almost exclusively a disease of the native population the housing of Europeans Chinese and other groups providing considerable protection against plague. The seasonal prevalence curve shows a maximum at the beginning of the rainy season followed by a remission in the first half of the dry season. The form is bubonic with a small proportion of pneumonic but the latter is never epidemic. The principal host is the brown Malayan house-rat (*R. rattus diardii*) and the vector *X. cheopis*.

The chief anti plague measures are a systematic improvement of houses with large-scale vaccination as an accessory means of attack. Houses are being rebuilt in such a way that the nesting of rats is impossible. Thatched roofs are replaced by tiles double walls removed and bamboo replaced by wood.

**Tuberculosis**—Government and private institutions co-operate in preventive work which takes the form of education treatment and isolation of persons suffering from open tuberculosis. better housing raising the resistance of the general population by campaigns against community diseases such as malaria and hookworm and improving the standard of diet. Much useful social and hygienic work is carried out by an Association for Tuberculosis control with local branches in many of the towns.

**Yaws** is widespread in the Netherlands Indies. It is usually treated with Neosalvarsan. Millions of people have been treated in the hospitals and clinics. Special campaigns of mass treatment are organised in districts where this is necessary the entire population is examined and all infectious cases are treated. As a rule three injections are required.

The report is illustrated by twenty-nine photographs depicting amongst other subjects housing health education anti-malaria measures and sanitary structures.

IV H Peacock

## MALARIA

FEDERATED MALAY STATES. Annual Report of the Malaria Advisory Board for the Year 1936 [KINGSBURY (A. Neave) Chairman]. 17 pp With 4 charts. 1937 Kuala Lumpur F.M.S. Govt. Press.

Malaria in the Federated Malay States in 1936 was less severe than in the previous year though the number of cases treated in Government and estate hospitals, upwards of 27,000 admissions was in excess of the corresponding figures for 1933 and 1934. The case mortality rate of cases treated in hospitals has steadily declined from 3.0 per cent in 1933 to 2.2 per cent in 1936. Improved methods of treatment and improving economic conditions have contributed to this decline. Graphs are produced illustrating the seasonal prevalence of malaria in the four States of the Federation. The curves exhibit differences which are probably explicable by varying degrees of prevalence of the anopheline vectors in the different States. In other words the area subject to attack by *A. maculatus*, *A. umbrosus*, *A. barbirostris*, *A. syndensis* and *A. hyrcanus* vary in size and in density of population from State to State.

Observations have been carried out regarding the efficacy of atabrin musonate in the treatment of malaria. The immediate curative effects were satisfactory the drug is considered to be one of the most powerful schizonticides known. Toxic effects are however occasionally alarming. For this reason the report considers that atabrin musonate is not a drug which can be recommended for indiscriminate use.

The results of chemo-prophylaxis experiments on estates are reported (see below p. 36).

Experiments to test the relative larvicide efficiency of various oil mixtures are being carried on and information is supplied regarding the local cost of oil spraying and the cost of permanent drainage. The anopheline survey of part of the Selangor Coast area continues.

Attention is directed to the facilities for mosquito breeding provided by pits left by the uprooting of old trees on rubber estates and by holes prepared for replanting. The pits should be filled up immediately. It is recommended that holes for replanting be filled with a mixture of top soil and green vegetable material rubber leaves, small twigs or any available cover plants.

The prevention of the deterioration of open cement drains by the action of acid waters is still the subject of experiment. Observations are also being continued on the control of *A. maculatus* breeding by heavy shading.

Norman White

DAUER (C. C.) & FAUST (Ernest Carroll). Malaria Mortality in the United States, with Especial Reference to the Southeastern States.—*Southern Med J* 1937 Sept. Vol. 30 No. 9 pp 939-943 With 1 chart

This is a study of the deaths ascribed to malaria during 1935. There was a definite decline of the mortality curve from the 1933-34 peak in Arkansas, Mississippi and Florida—an appreciable decrease also in Georgia, Tennessee and Oklahoma—but a considerable increase in South Carolina, Alabama, North Carolina and Virginia. In all these States

there was a tendency for the rates to decline in the worst endemic areas and to increase elsewhere. Available records of the species of parasite responsible for this malaria mortality and morbidity are considered to be too unreliable for analysis

N II

EARLE (Walter C) The Relation between Breeding Area, *Anopheles albimanus* Density, and Malaria in Salinas, Puerto Rico — *Southern Med J* 1937 Sept Vol. 30 No 9 pp 946-949 With 2 charts.

An account of the eventual elimination of the malaria vector and malaria chiefly by drainage in difficult circumstances. The potential breeding places were far more numerous than were necessary to maintain a high mosquito density. The mosquito density was much higher than was necessary to maintain a high parasite rate. Neither the mosquito density nor the malaria prevalence was materially reduced until nearly all the breeding places had been brought under control. The malaria prevalence was not affected until the mosquito density had been brought down to and maintained at an extremely low figure

N IV

DUREN (A) Un essai d'étude d'ensemble du paludisme au Congo Belge. [Comprehensive Study of Malaria in the Belgian Congo]—Extrait des *Mémoires* publiés par l'Institut Royal Colonial Belge. (Section des Sciences naturelles et médicales.) Collection in-8o. Tome V 86 pp With 4 text figs. & 3 figs. (2 maps) on 2 plates [92 refs.]

This is an interesting summary of the more important information concerning malaria in the Belgian Congo that has been published during recent years. The country is vast covering 2,350,000 square kilometres and extending from 5°N to 13°S. Two-thirds of it lie south of the Equator. Half the country is covered by equatorial forest which extends to within 100 kilometres of the eastern frontier. The altitude of this forest land is from 350 to 500 metres. Rain is abundant throughout the year (1,500 to 2,000 mm.) with maximum precipitation from March to May and August to November. Between 3° and 5°N and 4° and 13°S the forest gives place to wooded plains rising towards the east and south-east and culminating in the mountains which surround the great lakes and in the high plateau of Katanga. In these wooded plains the climate is tropical. The rainy season is from April to October in the north and from October to April in the south. In both the dry season is the cold season. The annual rainfall is from 1,000 to 1,500 mm. The altitude of the wooded plains is from 500 to 1,500 metres. Numerous rivers run from east to west or south to north the Congo describing a vast semicircle. Marshes are very numerous especially in the equatorial zone. There are two annual rises in the river levels in December and in April in Leopoldville the former is the more considerable.

The population comprises 18,500 Europeans and 10,000,000 natives (excluding Ruandi-Urundi). Of these natives some 500,000 are congregated round European centres of population the remainder living in their ancestral villages and communities. The birth rates, death rates and infant mortality rates are all high.



Malaria is second only in importance to trypanosomiasis among the endemic diseases of the Congo. Among the European population, however, it is becoming less prevalent and less severe and this in spite of the fact that women and children form a larger proportion of that population than heretofore. The mean annual malaria morbidity rates for Europeans were 220 per thousand in 1918-20, 152 in 1921-30 and 141 in 1931-34. The mean annual malaria mortality rates during these three periods were 6.39, 3.1 and 1.82 per thousand respectively.

For the native population comparable figures are of course unobtainable. The general mortality rate oscillates between 25 and 90. Of patients treated in hospitals only 3 per cent are cases of malaria of these 1 per cent die. Malaria is a very important cause of mortality in children aged 0 to 3 years being responsible for 16.5 per cent. of the total deaths at this age. This is for regions in which treatment is available. As a direct cause of death in ripe age it is insignificant.

The pygmies living in the Forest of Ituri have a parasite index of 29-11 (children 40 adults 22.7). Of the infections 80 per cent. are *falciparum*. The Bantu population is more heavily infected. Reports of 44,901 persons examined in different parts of the country during 12 years indicate a parasite index of 51.2 and a spleen index of 35. If the parasite positives be added to those with enlargement of spleen in whom no parasites were discovered 61.4 per cent. show signs of infection. If those with splenic enlargement be added to parasite carriers without enlargement of spleen a rate of 51.3 is obtained. The parasite index during the first year of life is 63.7.

Malaria is endemic in all parts of the country at altitudes below 1,500 metres and the degree of endemicity varies but little. Above 2,000 metres endemic malaria does not occur. At high altitudes where malaria is not or only mildly endemic in parts of Ruanda Urundi for example, epidemics of malaria occur. During such serious outbreaks severe cases of haemoglobinuria occur among natives and are often fatal.

Between 1918 and 1934 cases of haemoglobinuria reported among Europeans total 1,115 of whom 217 died. The medical corps is almost unanimous in looking upon chronic *falciparum* malaria as the essential cause of haemoglobinuria, the directly exciting cause being chill privation, overwork or quinine. Those who take prophylactic quinine regularly are very rarely attacked. There is generally a history of a dose of quinine taken during an attack of fever by a person who does not take the drug prophylactically. Cases are very rare among natives living in endemic areas.

Of 7,350 positive blood findings 78.8 per cent. were *falciparum*, 2 per cent. *malariae* and only 3.4 per cent. *vivax*. The preponderance of *falciparum* is slightly less marked at high altitudes. Twenty-one species of *Anopheles* have been reported from the Congo. *A. costalis* is most abundant. It is an urban and peri-urban species. *A. funestus* and *A. marshallsi* var. *moscheri* are wild rural species very prevalent in native villages. *A. maculipennis* is ubiquitous but seldom found in large numbers.

The building of towns in dried-up marshes, with all that this entails has had very notable results in the reduction of malaria in the case of Matadi. In the construction of towns the native quarters are placed at a distance from the European. The intervening space being planted with trees. There is widespread belief in the utility of quinine prophylaxis, 40 to 50 grains a day. There have been many attempts to

cultivate *Cinchona succubra* At altitudes over 1 500 metres in the north-east of the Congo the results are promising N II

HILL (Rolla B) The Malaria Problem in Portugal.—*Southern Med J* 1937 Sept. Vol 30 No 9 pp 953-956

In 1933 the Rockefeller Foundation assisted in a country wide malaria survey of Portugal and in the following year established a station in the worst malaria region The author's paper is based on data collected in this way

Only two species of Anopheles are found in Portugal *A. bifurcatus* and *A. maculipennis* var *typicus* and var *atroparvus* *A. bifurcatus* is a wild species and rare. *A. maculipennis* var *atroparvus* is the only malaria carrier It is found everywhere in Portugal even in places where malaria is absent in such places it is not found in abundance and is zoophile Most extensive breeding takes place in rice fields. In Portugal it is a fresh-water breeder

Malaria is a public health problem in five regions they lie in the river basins of the Sado Mondego Tagus Guadiana and Minho Rivers In the first three the malarious areas grow a large amount of rice in the latter two the disease is restricted Itinerant labour is largely employed in planting weeding and harvesting rice crops. Malaria control is very closely connected with rice-field Anopheles breeding Screening of itinerant labour barracks and improvement in agricultural methods are necessary Intermittent irrigation of rice fields has proved successful experimentally its wide application might effect a marked improvement. N IV

BERNABAI (Adalberto) L'indice splenico e l'indice plasmodico nei bambini di Goluine di Bullo Mererta (Vittorio d Africa) [Spleen and Parasite Indexes in Goluine and Bullo Mererta, Italian Somaliland.]—*Giorn Ital di Clin Trop* 1937 Aug 31 Vol 1 N.S. No 8. pp 243-244

The observations recorded are part of a series whose object is the construction of a malariology map of Italian Somaliland One hundred and fifty native children in Goluine and 100 in Bullo Mererta were examined both places are in Lower Scebeli. The parasite index in Goluine was 28 per cent (*falciparum* 14 *vivax* 12.6 and *malariae* 1.3) in Bullo Mererta it was 19 (*falciparum* 11 *vivax* 8) The spleen index in Goluine was 82 and in Bullo Mererta 62. The examination of thick drops was used in the determination of the parasite index. N IV

DRBOHLAV (Jaroslav) Constatacion de cas de paludismo a *Plasmodium falciparum* en Tchecoslovaquie. [Cases of *falciparum* Malaria in Czechoslovakia.]—*Bull Office Internat d'Hyg Publique* 1937 Sept Vol. 29 No 9 pp 1924-1926 With 1 map

Malaria in Czechoslovakia is confined to sub-Carpathian Russia and to the adjacent districts of Slovakia. It does not present a serious public health problem but there was an increase in malaria prevalence in 1928 and again in 1933-35 Practically all cases were *vivax* infections In 1936 cases of *falciparum* infection were first noted there have been 16 cases in 11 communes of sub-Carpathian Russia and 11 cases in 3 communes of adjacent districts of Slovakia The

natural immunity."

other hand phagocytosis is in addition specific." The authors consider that general defence reactions are essentially local reactions in strategically placed organs. When malarial parasites are introduced into an immune animal there is (1) a regional concentration of parasites and (2) increased phagocytic action. This is homologous, say the authors, "with what takes place in streptococcal infection." As regards Part II of the memoir entitled *The Cellular Reactions in Silentus rheuma During the Course of Infection with Plasmodium knowlesi* it is impossible to do justice to a valuable piece of original work in this nature in a brief review. Altogether the authors examined 12 monkeys, of which 12 were normal and 67 were infected with either *P. knowlesi* or *P. cynomolgi*. Great detail the tissues from 79 monkeys, of which 12 were normal and 67 were infected with either *P. knowlesi* or *P. cynomolgi*, relating to each of these respectively. The more important data relating to each of these monkeys are given in tabular form in the memoir and these tables are self-explanatory. The authors find that phagocytic activity is lymphoid hyperplasia and the concomitant cytogenesis of macrophages are initiated in the spleen and are always most pronounced there but similar changes though in a less degree also occur in the liver and bone marrow as the intensity of malarial stimulation increases. In the opinion of the authors themselves, the chief significance of their work lies in the information obtained regarding the source and cytogenesis of the newly formed macrophages which are associated with the defence of the body against malaria. We can heartily recommend this memoir. C A Bradley

CIUCA (M) BALLIF (L) CHELARESCU (M) ISANOS (M) & GLASER (L)  
Action of Quinine and Atebrin on the Sporozoites of *Plasmodium falciparum*—*Trans Roy Soc Trop Med & Hyg* 1937 July  
31 Vol 31 No. 2 PP 235-240

The salivary glands of 18 Anopheles infected with malignant tertian malaria were dissected on a slide in a solution of basic quinine, 1 in 2,500. The resultant suspension 0.5 cc. was injected intravenously into a patient requiring malaria therapy. The patient contracted malaria after an incubation period of 15 days. The sporozoites from the different glands were not of course in contact with the drug for the same time before injection the minimum exposure was 30 minutes. The glands took 30 minutes to dissect.

A second patient received an intravenous injection of a suspension of the sporozoites from 14 salivary glands in a solution of atebrian 1 in 2,500. Evidence of infection was observed on the 15th day.

In a second series of experiments each patient received intravenously a suspension of sporozoites from a single infected gland, the dissection being made as before in the solution of the drug. Four patients received a suspension of sporozoites in a solution of basic quinine, four a suspension in a solution of atebrian and four as controls, a suspension in Ringer's solution. The contact of the sporozoites with the drug was of 15 minute's duration. One of the atebrian series, two of the quinine series and two of the four controls became infected.

It would thus appear that malaria sporozoites are able to withstand the direct application of quinine and of atebrian in a concentration of 1 in 2,500. N IV

INI (Guido) Il periodo di maturità sessuale delle semilune [Duration of Sexual Maturity of Crescents.]—*Riv di Malarologia* Sez. I 1937 Vol 16 No 2. pp 108-110 With 25 coloured figs. on 1 plate English summary (8 lines)

In addition to the immature forms of crescents which develop in internal organs of cases of *falciparum* infection the author describes figures two other stages in the development of crescents both of which are found in the peripheral blood—the well recognized mature forms that are capable of infecting anophelines and senescent forms which have lost that power. These senescent forms can be easily recognized in well prepared films. They are very thin transparent bodies, either vacuolated or granular staining more or less uniformly, often incurved or with the thin ends folded at a right angle to the long axis of the crescent. They appear to have lost their elasticity and are easily folded. They are most commonly seen in chronic cases in persons who have been harbouring crescents for at least ten days.

N II

MALAMOS (Basilios) Malaria und reticulocyten. [Malaria and Reticulocytes]—*Älin Woch* 1937 June 19 Vol. 16 No 25 pp 885-887 [13 refs]

The author is unable from his observations to confirm the statement of JACOBSTHAL (this *Bulletin* 1936 Vol. 33 p 779) that a large portion of malaria parasites are contained in reticulocytes. [The reviewer can confirm Malamos's findings from his own investigations on this subject.] Also the view of HUNGER that Schüffner's dots are of reticular nature cannot be regarded as established. The two populations stand in no relation to each other in the opinion of the reviewer.

E D W Greig

LAIN (Georges) & DUPOUX (Robert) Contribution à l'étude sérologique du paludisme. Utilisation d'une mélanine artificielle la M.A. flocculation. [Contribution to the Serological Study of Malaria. Flocculation with the Use of an Artificial Melanin.]—*Arch Inst Pasteur de Tunis* 1936 Nov Vol. 25 No 3 & 4 pp 469-551 With 5 figs. [64 refs]

This paper starts with a concise historical account of Henry's reaction and of the large amount of work that has been devoted to its elaboration, modification and significance. The different views that are held regarding the nature of the reaction are well presented. More than three years work, devoted by the authors to the search for other substances has led to the conclusion that the melanins are the best serological detectors of malaria at present available. They have succeeded in preparing an artificial melanin combined with iron, a dark brownish black liquid, which in suitable doses behaves almost exactly like Henry's melanin preparation. It is made by oxidizing rosine with hydrogen peroxide in the presence of a small quantity of perchloride of iron. This is the preparation which they designate A. Full details are given concerning its preparation and use. The technique is easier than that of Henry's reaction and the authors consider that it should be of value to malarialogists working away from well equipped laboratories.

N IV

D ALESSANDRO (G) Sulla cura di Maurizio Ascoli nelle infezioni malariche. Nota VI.—Comportamento della reazione di Henry [Behaviour of Henry's Reaction in Cases of Malaria Infection treated by Ascoli's Method.]—*Riv di Malarologia* Sez. I 1937 Vol 16 No 4 pp. 290-294 [40 refs.] German summary

The behaviour of Henry's reaction was studied in 32 cases of chronic malaria that were being treated by Ascoli's method. In nearly all cases that gave a positive reaction at the beginning of treatment the reaction became negative before the end. In cases which gave a negative reaction at the beginning the treatment promptly reactivated the reaction which once more became negative before the end of treatment. This influence that Ascoli's treatment has on Henry's reaction constitutes yet another argument in favour of its efficiency.

MATSUBOBU (Masamu) Beiträge zur Kenntnis der Hämatologie bei Malaria. II Mitteilung. Das Studium des Knochenmarkbildes durch Sternalpunktion [The Blood in Malaria. III. Study of the Bone-Marrow]—*Tsishon Igakkaï Zasshi* (Jl. Med Assoc Formosa) 1937 Sept Vol 36 No. 9 (380) [In Japanese pp 2104-2115 [14 refs.] German summary p 2116.]

Study of the bone-marrow obtained by sternal puncture in cases of malaria was undertaken with several ends in view. First, to note haematological changes in the course of the disease; second, the form of the parasites in the intervals between attacks or relapses; thirdly, to determine whether parasites were more numerous there than in the peripheral blood as an aid in clinical diagnosis if they were scarce in the latter; and lastly to see whether the parasites preferred young to old corpuscles for attack.

It was found in smear preparations that parasites were not more numerous than in the peripheral blood and therefore sternal puncture has no diagnostic advantages. The plasmodia showed no particular tendency to invade the younger forms of erythrocyte. The myeloid reaction 2-3 days after reduction of the fever by atabrin and plasmoguin was not marked, in fact the marrow picture showed no departures from the normal.

MOSNA (E) & CAXALIS (A) Profilassi e terapia della malaria coi prodotti sintetici (Esperienze coordinate dal Comitato d'Igiene della S.d.N.) [Prophylaxis and Treatment of Malaria with Synthetic Drugs. Experiment coordinated by the Health Committee of the League of Nations.]—Supplement to *Riv di Malarologia*, Sez. I 1937 Vol 16, No 3. 74 pp. With 1 fig & 4 graphs. English summary (8 lines)

A well written report of well controlled observations on the value of atabrin as a prophylactic of malaria and of atabrin and plasmoguin in the treatment of the disease. The prophylaxis experiment was carried out in Posada a small town of 150 houses and a population of 781 in Sardinia. The population is a stable one poor badly housed and indifferently nourished. Practically everyone is infected with malaria. Tuberculosis and trachoma are also widespread. Anophelines are very prevalent. *A. maculipennis labranchies* being of chief importance it attains its maximum prevalence in June. Before

the experiment began on the 13th May 1935 the spleen index of children under 15 years of age was 78.7 per cent, and the parasite index 21 per cent. The population was divided into three groups as nearly homogeneous as possible. The first group consisting of 235 persons received 0.05 gm of atebirin daily, smaller doses for young children. The second 244 persons received 0.20 gm of atebirin twice a week (adult dose). The third 229 persons was the control group. The administration of the drugs was continued till the end of October and the observation of the population was continued till the following April. No symptoms of drug intolerance were observed. Between May and October there were 55 cases of malaria in the daily group 23.4 per cent, 34 cases in the bi-weekly group 13.9 per cent, and 161 cases in the control group 70.3 per cent. In the neighbouring town of Torpé where anophelines are less prevalent there were 924 cases in a population of 1000 as compared with 250 cases among the 781 people of Posada. Atebrin was a more effective preventive of malarial fever than of *falciparum* malaria. Gametocyte carriers observed were 1.7 per cent of the daily group, 0.8 per cent of the bi-weekly group, and 4.8 per cent of the control group. In the post prophylaxis period November to April there were 91 cases of malaria among the 781 people of Posada as compared with 221 cases among Torpé's 1000 people. During these months cases in the daily group were 14 per cent, in the bi-weekly group 6 per cent, and in the control group 18.7 per cent. The anopheline infective rate was 1.1 per cent, as compared with 2 per cent in Torpé. The reduction of morbidity was less marked among children under 8 years of age indicating probably that the doses given were too small. Better results were obtained by the bi-weekly than by the daily administration of the drug.

Observations on the curative value of the drugs were carried out on 940 cases in Torpé. No cases exhibited intolerance to atebirin worthy of note but among 27 patients treated with plasmoquine for five days 14 exhibited symptoms of varying degrees of severity attributable to the drug. The observations confirmed the well known therapeutic value of these drugs. N IV

SPAAR (Eric C.) The Modern Treatment of Malarial Fever.—*Malayan Med J* 1937 June Vol 12, No 2, pp 44-46

A discussion of the merits of the cinchona derivatives and synthetic drugs in the treatment of the various forms of malaria and the indications for their use. N IV

BORMIOLI (M) Considerazioni sulla terapia delle perniciose e delle gravi forme estivo-autunnali. [Treatment of Pernicious and Severe Attacks of Malignant Tertian Malaria].—*Ann di Med Nav e Colon* 1937 July-Aug 43rd Year Vol 1 No 7-8 pp 318-322, 325-330. With 4 charts.

The author claims to have had a large experience of the treatment of pernicious cases of *falciparum* infections. He advocates the administration of quinine in doses that are seldom given nowadays. Representative cases are described. The diagnosis having been established an intravenous injection of 2.0 gm. of quinine is given and followed during the first 24 hours by three intramuscular injections each containing 1 gm. of quinine. During the second and third

days four injections each containing 1 gm of quinine are given each day one of these four injections is usually intravenous the others intramuscular Further treatment depends on the progress of the case it is continued on the same heroic scale when necessary Such doses the author states have been well tolerated. Such treatment kills all forms of the parasite and prevents relapse. N W

MÜLLER-OSTER (Wolfgang) Die Behandlung der Malaria und ihre Verhütung in der Kriegsmarine in den Jahren 1920-1933 (Zugleich ein Beitrag zur Frage der Kriegsmalaria).—Reprinted from *Deut. Militärarz.* 1937 Vol 2 No 1 pp 25-35 [31 refs]

SAUTER (J) A propos du traitement du paludisme par les dérivés de la dihydroquinamine [Treatment of Malaria with Derivatives of Dihydroquinamine].—*Bull. Soc. Path. Exot.* 1937 June 9 Vol. 30 No 6 pp 461-467

This note records the results of treatment of 4 cases of malaria by intramuscular injections of dihydroquinamine derivatives and of ten cases treated by these derivatives in tablet form. Nausea and gastralgia attributable to the injections, detract from the value of this form of treatment which otherwise gave good results. The tablets were for the most part quite ineffective. N W

CHOPRA (R N) HAYTER (R. T M) & SEN (B) A Comparative Study of the Action of Atebrin and Atebrin-Plasmochin Combination on Indian Strains of Malaria. Part II.—*Indian Med. Gaz.* 1937 Aug Vol 72 No 8. pp. 458-462.

A record of the treatment of 45 cases of malaria with atebrin plasmoquine dragées atebrin 0.1 gm and plasmoquine 0.005 gm. The usual dose for an adult was one dragée three times a day for five consecutive days. Of these cases 14 were virus infections, 20 *falciparum* 3 *malariae* and 8 mixed. The results of treatment were compared with those obtained in another series of 37 cases treated with atebrin alone. The following conclusions are reached. In cases of benign tertian the combination is no more effective than atebrin alone as judged by the rapidity of the disappearance of parasites from the blood stream. In malignant tertian when the combination is more effective. Relapses are less frequent when combined drugs have been administered the number of cases treated was small. Both methods of treatment are of equal value with regard to reduction in the size of the spleen. The combination has drugs is more toxic than is atebrin alone. The combination has distinct advantages in the treatment of malignant tertian cases, especially if crescents be present, but has no particular advantages in the treatment of benign tertian and quartan cases. N W

NAYUDU (R. V N) Malaria and its Treatment by the Synthetic Remedies Atebrin and Plasmochin.—*Indian Med. Gaz.* 1937 Sept Vol. 72 No 9 pp. 531-532.

A record of the treatment of 187 patients suffering from mainly benign tertian with atebrin for five days followed by plasmoquine for five days, in the usual doses. The results were good.

CABRAL (Joaquim) Observações sobre a acção do M3 na cura da malária crónica [The Action of M3 in the Treatment of Chronic Malaria.]—*Bol Geral Med e Farm* 1937 May June & July Ser 19 Nos 5 6 & 7 pp 136-158

M3 contains manganese and mercury in the form of a double iodide combined with spleen extract. The mercury is credited with immunizing activity whilst the manganese and spleen extracts stimulate red cell formation promote the formation of antibodies and thus combat anaemia and malaria cachexia. This paper recapitulates at length the results reported by PERINI which prompted the author to undertake the experimental treatment of thirteen cases of chronic malaria in Goa details of which are given. Symptoms of drug intolerance were observed in half the cases bilious vomiting diarrhoea and albuminuria in one case the treatment had to be stopped. The conclusion arrived at is that M3 can be considered as helpful in the treatment of chronic malaria by improving general nutrition and anaemia and effecting reduction in the size of the spleen but that it cannot be relied on as a gametocide or as a preventive of relapse. N II

PETER (F M) Die synthetischen Malariamittel.—Reprinted from *Ergebnisse der Hygiene Bakteriologie Immunitätsf u Experim Therap* 1937 Vol 19 pp 83-128 [8 pages of refs]

GONGGRIJP (L.) & SOEDICHO (R.) Atebrine en kinineverstrekking in een chronisch endemisch malariagebied.—*Geneesk Tijdschr v Nederl Indië* 1937 June 15 Vol 77 No 24 pp 1471-1477

EJERCITO (Antonio) & SANTOS (Gregorio O) The Philippine Totaquina in the Treatment of Human Malaria Preliminary Report.—*Monthly Bull Bureau of Health Manila* 1937 June Vol. 17 No 6 pp 219-240 With 5 graphs.

This is a record of the treatment of 74 cases of malaria with totaquina and 152 cases treated with quinine all adults. The Philippine totaquina used is of Type I that is the total alkaloids extracted from the bark of either *C. succubra* or *C. robusta*. It was given in doses of 0.5 gm. four times a day. The quinine sulphate was given in tablet form five grains four times a day. The results show that there is very little difference in the therapeutic value of the two methods of treatment. Totaquina in the doses used was well tolerated. N IV

ARACTINGI (Joseph) Essai de toxino-thérapie antipaludique. [Experimental Toxin-Therapy of Malaria.]—*Rev Méd et Hyg Trop* 1937 May-June. Vol. 29 No 3 pp 176-178

On the supposition that the blood of a patient suffering from malaria contains a toxin excreted by the malaria parasite the author of this note injected subcutaneously 10 cc. of the patient's whole blood with the idea of provoking the formation of antibodies that might act on the parasites enclosed in the spleen. The blood was extracted and the injections made during fever free intervals. The experiment was made on a hundred malaria patients in an intensely malarious village Gozlanie about 19 miles south-east of Damascus. Most of the infections were *vexax* *falciparum* infections were rare. Each



patient received four injections at intervals of from three to five days. All the cases were old infections. In 80 of the cases fever ceased after the third injection. They were kept under observation for seven months none of them had a relapse and their health was excellent. In 15 cases the fever ceased after the fourth injection but there was a mild return of fever some twenty days later. Five patients who had continued fever derived no benefit from the treatment they were given subsequently intramuscular injections of quinine

A B

PREScriBER 1937 Nov Vol. 31 No. 11 pp 355-367 [57 refs.]—  
The Treatment of Malaria. A Year's Progress.

CIUCA (M.) BALLIF (L.) CHELARESCU (M.) ISANOS (M.) & GLASER (L.)  
On Drug Prophylaxis in Therapeutic Malaria.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937 July 31 Vol. 31 No. 2. pp 241-244

The observations reported in this paper are concerned with 45 patients infected therapeutically, mostly by infected mosquitoes with either *Pl. falciparum* or *Pl. vivax*. Of 12 persons exposed to infection with *falciparum* and given daily prophylactic doses of atebirin 0.3 gm. over a period of 11 days, not one became infected. Of 14 similar cases but given prophylactic quinine, 1.0 gm. a day for the same period, only one gave evidence of infection and then only by showing parasites without fever after 48 days incubation. Of five controls three acquired definite infection fever and parasites, and two became parasite carriers. Of the *vivax* cases four treated with atebirin remained free from infection. Of three treated with quinine one became infected. Of seven controls three showed parasites and fever three parasites alone and one was immune.

The authors consider that the therapeutic action of these drugs is upon the schizogonic forms of the parasite and not upon the sporozoites or any intermediate stages. In *falciparum* infections an interval of 5 days elapses between infection and the appearance of schizogonic forms in the blood

N B

OGANOV (L. I.) YEFIMOV (I. A.) & MILOVZOROVA (E. I.) Acriquine as an Anti-Malaria Prophylactic.—*Med. Parasit. & Parasitic Dis.* Moscow 1937 Vol. 6 No. 2. [In Russian pp. 209-214 English summary p. 214]

1. Small doses of acriquine 0.4-1.2, altogether taken over a period of 2 to 22 days affords no protection against the invasion of sporozoites.

2. In doses of 0.4 g. given every 10 days under clinical conditions during one summer season it had a good prophylactic effect. Not a single case of malaria occurred in the group who took this treatment faithfully whereas among those who took it irregularly there were 2 cases of malaria, a morbidity rate of 2.6 per cent. In the parasite survey during the autumn, no parasites were observed in any of the persons who had taken acriquine, whereas in the control groups (those who had received no acriquine at all) there was a 6.4 per cent. rate of primary infection.

9 By successfully suppressing the clinical symptoms of primary and recurrent attacks which are inescapably bound up with the appearance of gametocytes in the blood acriquine may be used to lower the infectivity of mosquitoes

JALALYAN (Z A.) & KARASEVA (O A.) Acriquine as an Anti-Malarial Prophylactic.—*Med Parasit & Parasitic Dis* Moscow 1937 Vol 6 No 2 [In Russian pp 215-219 English summary p 219]

The authors administered acriquine as a prophylactic measure with the following results among the 127 persons taking the drug 4 individuals or 3.1 per cent. came down with malaria during the prophylactic period while among the 114 controls 15 persons or 13.2 per cent. became ill. The authors conclude that the Soviet preparation acriquine may safely replace quinine as a prophylactic against malaria and may even be preferred to the latter for this purpose since it does not have any of the secondary ill effects of quinine.

RACHINA (M G) MELJUTINA (E T) KOGAN (A G) & ELISSÉVA (S I) Efficacité comparée du traitement préventif des rechutes par l'acriquine et la quinine appliquées à différentes périodes.—[Comparative Value of Acriquine and Quinine, administered at Different Periods in the Prevention of Relapses of Malaria].—*Med Parasit & Parasitic Dis* Moscow 1937 Vol 6 No 2. [In Russian pp 155-179 With 5 figs. French summary pp 179-180]

In Russia considerable attention is given to treatment designed to prevent relapse of those persons who have suffered from malaria in the previous year. Four thousand persons adults and children who suffered from malaria during 1935 were kept under observation. These were divided into four groups. The first group received treatment half with acriquine the other half with quinine from February 1st to March 1st 1936. The second group was treated similarly from March 15th to April 15th. The third group was treated from April 15th to May 15th. The fourth group serving as a control received no treatment. Acriquine was given daily for five days then a ten-day interval then daily for three days followed by a second ten-day interval and a final three-day course of the drug. The daily dose of acriquine was 0.20 gm for adults 0.15 for school-children. Sulphate of quinine was given three days consecutively followed by an interval of four days this was repeated three times. The daily adult dose of quinine was 1.0 gm for school children 0.6 gm. Monthly blood examinations were made of all from January to October and malaria attacks were carefully registered. In the first group the relapse rates up to July 1st were acriquine 8.2 per cent. quinine 6.4. In the second group these rates were 3.9 and 10.2. In the third group 1.4 and 3.1. In the control group the relapse rate was 14.6 per cent. The authors conclude that the efficiency of such treatment depends on the time of year at which it is administered. If treatment be begun a few days before the annual wave of benign tertian relapses it can prevent such relapse and is beneficial to the patient's health. It reduces the number of acute attacks of fever and the days of incapacity for work.

N W

sometimes substituted. In only a few cases was the full course of 30 injections necessary. In most they were limited to 20. The treatment was well tolerated and the results satisfactory as regards diminution of the size of the spleen, increase in the red blood cell count and of the haemoglobin index and improvement of the general condition of the children. N 11

CHMÉLOVA (J.) & SCHLONOVA (M.) Contrôle entomologique direct de l'efficacité des moustiquaires des lits et du grillage. [Direct Entomological Control of the Efficiency of Mosquito Nets and Metallic Screening].—*Med Parasit & Parasitic Dis* Moscow 1937 Vol. 6 No. 2 [In Russian pp 250-257 With 5 figs. French summary p 258]

This describes the methods used to determine the efficiency of the mechanical means adopted to protect the workers of the Ozeretsk peat works, near Moscow from mosquito bites. The criteria of efficiency of screening are the number of mosquitoes captured by hand in the protected dwelling and the number caught in a trap at the exit. The number caught in a trap at the entry gives an idea of the number trying to get in. The protection afforded by mosquito nets is indicated by the percentage of mosquitoes engorged and with eggs of those caught in a trap at the exit and by the number caught under the nets at the morning inspection. The number of mosquitoes that succeed in entering the protected house is ten times less than the number entering control houses and even if the protection be incompletely carried out without springs to the doors for example the infestation of dwellings with mosquitoes is greatly diminished. The use of the mosquito net halves the number of mosquitoes found engorged in the barracks. The use of metallic screening combined with the use of mosquito nets gives very considerable protection but the necessity of killing all adult mosquitoes found in dwellings should not be overlooked. N 12

FIELD (J. W.) NIVEN (J. C.) & HODGKIN (E. P.) The Prevention of Malaria in the Field by the Use of Quinine and Atebrin. Experiments in Clinical Prophylaxis.—*Bull Health Organisation*. (League of Nations.) 1937 Apr Vol. 6 No. 2 pp 236-290. With 11 figs. & 1 map

These experiments designed to supplement existing knowledge regarding the efficacy and safety of quinine and atebrin administered in regular doses over long periods as clinical prophylactics of malaria, were carried out by the Institute for Medical Research, Federated Malay States. They are a part of a coordinated scheme of research organised by the Malaria Commission of the Health Organization of the League of Nations. The experiments were made in the State of Selangor in a tea plantation with intense endemic malaria where there was no mosquito control, and in a rubber plantation with malaria of mild endemicity in which antilarval measures are only partially effective. The labour populations concerned were immigrants from South India. In the tea plantation the vector was *A. sambrosus* and the predominant parasite *P. vivax*. In the rubber plantation the vectors were *A. maculatus* and *A. sambrosus* and the predominant parasite *P. falciparum*. The manner in which the work was carried

out and the observations controlled makes this report of unusual interest. This is especially true of the work in the tea plantation. The results are admirably presented.

The experiment lasted from August 1935 to October 1936. Observations were made on 1,253 individuals. The populations were divided into three strictly comparable groups. Members of the first group each received atebryn 0.2 gm. on two successive days of each week. To members of the second group 0.4 gm. of quinine bihydrochloride was given daily. Members of the third or control group were given an inert substance. The doses mentioned are for adults. Children received smaller doses according to age. Both atebryn and quinine effected a marked reduction in the number of attacks of malaria. During the last six months of the experiment the reduction amounted almost to elimination. Atebryn exercised a more potent effect on the malaria incidence and on parasite rates than did quinine. When the administration of drugs was suspended there was a rapid reappearance of clinical malaria two weeks earlier in the quinine group than in the atebryn group. This post prophylaxis malaria was apparently due to infections that had been clinically and in many cases parasitologically hidden by the prophylactic treatment. The action of the drugs was in effect to prolong the incubation period up to as long as one year. Cases were almost twice as numerous in the quinine and atebryn groups as in the control group during the two months following the cessation of prophylaxis.

The risks attendant upon this prolonged use of atebryn are very slight. Two members of the atebryn groups who died had extensive liver damage. In neither case was it possible either to incriminate or exonerate atebryn in determining the fatal issue. In pregnant women in an intensely malarial region atebryn appears to improve the prospects of a live-birth.

Space precludes reference to many other facts of interest in an interesting and informative report. N II

HILL (Roy A.) & GOODWIN (M H) Jr. Comparative Drug Prophylaxis Survey of Malaria. Preliminary Report.—Reprinted from *Jl Med Assoc Georgia* 1937 May Vol. 26 No. 5 pp 179-182.

This is a study of the relative value of atebryn and quinine as prophylactics. The observations were made on a population of 337 living on a 16 000 acre plantation and all exposed to malaria infection. The atebryn group consisted of 109 persons each of whom received 1½ grains of atebryn three times a week. 108 persons in the quinine group received 10 grains of quinine daily. The control group numbered 120. The observations continued throughout the summer. The percentage of new infections in the atebryn group was 1.8 in the quinine group 5.5 and in the control group 31.6. The authors consider atebryn superior to quinine as a prophylactic and in the treatment of malaria. No reference is made to the species of parasite. N II

GOSIO (B) Considerazioni tecniche d'attualità sul trattamento profilattico e curativo della malaria.—*Terapia* Milan, 1936 Apr Vol. 28 No. 202, pp 97-104.

SBRIGHI (Cenno) Tratamento e profilaxia do impaludismo.—*Hospital Rio de Janeiro* 1937 Oct. Vol. 12, No. 4 pp 657-670.

as vectors of malaria and an interesting discussion of the factors which might explain their varying degrees of importance in this regard. It is based for the most part on observations made in Greek Macedonia but reference is also made to observations on *clutus* and *superpictus* in Cyprus. During the warmer months when malaria transmission is most active *clutus* is more apt to use houses as daylight resting places than is *maculipennis*—the ratio of densities *clutus* *maculipennis* being 1.0-4 in houses as compared with 1.1-4 in stables. The seasonal prevalence of these two species is very similar but *maculipennis* reaches its maximum prevalence about a month earlier than *clutus* and begins to decline earlier. The sporozoite index, based on dissections made during four years was *clutus* (24,549 dissections) 1.34 *maculipennis* (15,451 dissections) 0.08. A more significant comparison is based on the dissection of the two species collected on the same day in the same house or stable at least one sporozoite-positive mosquito of one or other species being found on that day indicating the presence of an effective gametocyte carrier in the vicinity. Of such 1,457 *clutus* and 1,311 *maculipennis* were dissected the sporozoite indexes were *clutus* 7.7 *maculipennis* 0.30. In the laboratory both species are equally susceptible to infection. The longevity of both species is approximately the same. Precipitin tests have shown that *clutus* has a much greater partiality for human blood than has *maculipennis* or rather *maculipennis* and *superpictus* are attracted to domestic animals whereas *clutus* is indifferent as regards choice of human or domestic animal sources of blood. This was shown experimentally. The climatic environment of the host does not appear to be a factor of any importance in determining the choice of host.

A *superpictus* plays a very minor rôle in the transmission of malaria in this part of Macedonia even though the sporozoite index may be high. This may be explained by the shortness of the *superpictus* season and the fact that the proportion of degenerated sporozoites is much higher in *superpictus* than in *clutus*. Blood ingested by *superpictus* takes longer to clot than in *clutus* and *maculipennis* and precipitable serum disappears more quickly.

## SPRUE.

\* FAIRLEY (N Hamilton) Tropical Sprue with Special Reference to Intestinal Absorption. Part I—*Trans Roy Soc Trop Med & Hyg* 1936 June 30 Vol 30 No 1 pp 9-32. With 9 graphs. [28 refs]

Dr N Hamilton Fairley expressed the opinion that the difficulty of dealing with the subject of tropical sprue had been increased by the tendency to identify coeliac disease idiopathic steatorrhoea and non tropical sprue as one and the same disease. Coeliac disease was essentially a malady of early childhood but adults were occasionally found who gave a history of prolonged intestinal disturbance in childhood and presented bony deformities and steatorrhoea in adult life. Other patients with steatorrhoea were encountered who enjoyed a healthy childhood and who had never been to the tropics. The term non tropical sprue was applicable here but this condition differed from tropical sprue in the severity of its clinical manifestations in the gravity of the prognosis and in its poor response to a therapeutic régime which resulted in patients with tropical sprue attaining robust health. Similarly a tendency to identify sprue and pernicious anaemia merely on the grounds that megalocytic anaemia was a manifestation common to both diseases still existed and throughout the paper certain essential differences in their pathology symptomatology biochemistry and response to treatment were stressed. Otherwise the lecturer confined his remarks to tropical sprue.

In regard to pathology the recent conclusion of THAYSEN that many of the intestinal lesions previously described at autopsy were due to necrobiotic changes had been confirmed by Fairley and MACKIE in a series of post mortem examinations made within a short time of death. Atrophy of the viscera was characteristic the average percentage decrease in the liver equalling 27.2 per cent the kidneys 20.5 per cent the heart 34.1 per cent and the spleen 35 per cent. The heart was generally small and showed brown atrophy in contrast to the large heart presenting fatty degeneration found in Addisonian pernicious anaemia. In both diseases megaloblastic hyperplasia of the red marrow occurred but in sprue fatty marrow persisting in the long bones often showed a peculiar gelatinous appearance similar to that seen in certain nutritional diseases and starvation.

Biochemical and other data founded on personal observation and relating to defective absorption of food constituents were then reviewed.

In tropical sprue steatorrhoea was the most outstanding feature and a single fat analysis of the stools had revealed a total fat value exceeding 25 per cent of the dried faeces in 56 out of 70 consecutive cases. With recovery the faecal fat was reduced to normal levels. Hypocalcaemia was a frequent finding and in 80 cases the total blood calcium equalled 8.8 mgm per 100 cc. Eleven cases presented tetany.

\*At a meeting of the Royal Society of Tropical Medicine and Hygiene held on the 21st May 1936 papers were read on tropical sprue and coeliac disease, with special reference to intestinal absorption, and a discussion by various authorities followed. Interest in the subject was considerably enhanced by the recent tendency in America and on the Continent to identify coeliac disease idiopathic steatorrhoea and tropical sprue and to consider avitaminosis the aetiological factor involved.

LUNDSTEEN (Erlang) Symptomatisk Steatorrhoea ved Carcinom diffus og Puerperium. [Symptomatic Steatorrhoea in Carcinom Diffusa and the Puerperium.]—*Hospitalstidende*. 1937 June 22. Vol. 80 No. 25 pp 698-706. With 3 figs. [16 refs.]

The late T. E. HESSE THAYSEN classified steatorrhoea as idiopathic or symptomatic including under the former heading coeliac disease and tropical and non-tropical sprue. The present communication does not deal with idiopathic steatorrhoea—now generally known in Denmark as Gee-Thaysen's disease—but with symptomatic steatorrhoea two cases of which Lundsteen describes in detail. The first patient was an unmarried woman born in 1883 and developing in 1934 stools typical of sprue. During the next 18 months she lost much weight suffered from frequent attacks of tetany and developed hypocalcaemia stomatitis, pigmentation of the skin and hyperchrome anaemia. The administration of sugar yielded a flat blood-sugar curve. The diagnosis of idiopathic steatorrhoea would have been almost inevitable but for the onset of violent abdominal pain prolonged fever and ascites. This clinical picture was more suggestive of abdominal tuberculosis. A post mortem examination excluded both diagnoses. The small intestine was studded with hard tumours, confluent or isolated some as small as a pin's head, others as large as an almond. Ulceration with perforation of one of these tumours had given rise to the stormy picture of the acute abdomen shortly before death. In the second case that of a married woman aged 24 a normal pregnancy and confinement were followed by steatorrhoea great emaciation, hyperchrome anaemia glossitis, latent tetany and a flat blood-sugar curve. Complete recovery followed blood transfusion and the administration of extracts of stomach and liver. Lundsteen confesses to complete ignorance of the factors governing the faulty absorption of fat from the intestines in these cases and he records them as two instructive examples of non-pancreatogen fat-diarrhoea.

C. Lillingston.

HOUWEMAAR (W.) Veldiarrhee van vegetatieleven oorsprong. [Fat Diarrhoea of Autonomic Nervous Origin.]—*Geneesk Tijdschr v Nederl Indië* 1936 Sept. 29 Vol. 76 No. 39 pp 2451-2470. [28 refs.] English summary

The occurrence in considerable number of cases of diarrhoea during the past four years in a single district and confined to Europeans is the most prominent character of the disease here described. The disease became known as "Sumeloengoen disease" after the district in question which is one situated in the foothills (200-700 m.) on the east coast of Sumatra. Actually the disease is not wholly confined to this district nor is it an entirely new disease.

Patients complain of tiredness, want of sleep sometimes of giddiness and sweating. Although stools are occasionally thin a true watery diarrhoea is infrequent, nor is the diarrhoea specially of morning type. Frequently blisters develop on the tongue and in the mouth. Emaciation may be a prominent feature and occasional attacks of urticaria are recorded. The faeces are light yellow but never grey in colour and sometimes acid in odour. Constipation may succeed diarrhoea. On microscopic examination there is found much free fat, chiefly in the split form and there may be present undigested starch,

iodophile bacilli and unchanged muscle fibre. Blood examination does not show hypochromic anaemia but did in one case show temporarily a hyperchromic anaemia. On test meal examination radiograms showed rapid passage of the food through the small intestine. As the large intestine can perform all the absorptive functions of the small intestine except that of split fat products it can be understood how in this disease with accelerated transit of food fatty acids and soaps remain evident in the faeces. If the hyperactive peristalsis be checked with opium the fat disappears from the stools thus showing that there is no lack of lipase and therefore that this is not a pancreas diarrhoea. The condition here described is known in the literature as soap dyspepsia. In this particular case a differential diagnosis must be made from sprue, hill diarrhoea and coeliac disease. Account has to be taken also of the fat diarrhoeas of gastroenterostomy, after gastrocolic fistula and of non tropical sprue. The author discusses especially the first three of these and comes to the conclusion in this particular case that besides the ordinary causes of soap diarrhoea due to disease of the intestinal tract there remained over a group of patients whose symptoms could only be referred to rapid passage of food through the small intestine and that this was part of a neurosis of the autonomic nervous system (tropical neurasthenia, leiodystonia). A strong impression was created that the occurrence of the disease in a restricted district was in some cases of the nature of psychic infection developing as a result of suggestion in neurotic individuals. A number of cases remained over in which no very satisfactory explanation could be given. *W F Harvey*

MILLER (D K) & BARKER (W Halsey) *Clinical Course and Treatment of Sprue—Arch Intern Med* 1937 Sept Vol 60 No 3 pp 385-414 With 5 figs. [13 refs.]

This paper presents a complete study of sprue based upon 33 patients in hospital during the past four and a half years. All but four had resided in tropical or sub-tropical countries. 11 in China, 9 in Porto Rico, 4 in Central and South America and one each from Cuba, Turkey, Algeria, Japan and the Philippine Islands. Of these 25 were females and 8 males.

On clinical grounds this series was divisible into three groups —

*A Group* — Patients with anaemia and diarrhoea.

*B Group* — Patients with diarrhoea but without anaemia.

*C Group* — Patients without anaemia or diarrhoea.

(A) The oral lesions consisted of (1) Atrophy of the lingual papillae (2) Redness of the tongue and oral mucosa and (3) Vesicular and ulcerated lesions of the tongue and mucous membrane.

Failure of the stomach to secrete free hydrochloric acid after injection of histamine was observed in one patient only. In four other patients free hydrochloric acid was absent until after the injection of histamine. In one only was the amount of free hydrochloric acid greater than 30.

Nine of the patients gave a history of having had anaemia before admission to hospital. The generally accepted pernicious anaemia changes were observed and the effect of anti-sprue therapy on the blood picture became very apparent.



suffering from sprue though perhaps not primarily. The common feature in all four patients was enlargement of abdominal lymph-glands the character in two being that of a lymphoma one lymphadenoma and one either this or lymphosarcoma.

[The authors in their discussion of these cases state that three of the four ended fatally but in the detailed report death is mentioned in two only.] The point however is that in each there was some form of adenopathy of the mesenteric glands resulting in lymphatic obstruction and malabsorption of food. The pathogeny is thus explained. Lymph stasis would result in defective absorption of fat and fat soluble vitamins A and D and steatorrhoea and malnutrition would follow. Failure of absorption of vitamin D might underlie the severe hypocalcaemia referred to above. Fatty acids present in excess in the stools by uniting with Ca to form insoluble soaps would further reduce the absorption of ingested calcium [see also this *Bulletin* 1932 Vol 29 p 463 1936 Vol 33 p 69]. [Incidentally it is not usual to express colour index as a percentage.] H H S

WOLTMAN (Henry W.) & HECK (Frank J.) Funicular Degeneration of the Spinal Cord without Pernicious Anaemia. Neurologic Aspects of Sprue, Nontropical Sprue and Idiopathic Steatorrhea.—*Arch Intern Med* 1937 Aug Vol. 60 No 2 pp 272-300 With 2 figs. [72 refs.]

Subacute combined degeneration of the spinal cord involves a major problem that centres about the type of degeneration usually associated with pernicious anaemia.

It is asserted that more than sixty associated conditions or causes, have been advanced for combined degeneration. Most usually the nature of the underlying pathological picture is neglected. The type of cord degeneration may not be entirely dissimilar. The typical picture of subacute combined degeneration when seen in an unusual setting always suggests that the condition is really pernicious anaemia in disguise. The funiculi of the spinal cord may be altered by many diseases and in many ways and the differential diagnosis cannot always be made upon clinical evidence alone.

Before the absolutely correct diagnosis of subacute combined degeneration of the cord can be made typical and well developed clinical and pathological observations must be brought forward as evidence.

The authors have made a comprehensive survey of the available literature of the subject and it appears that a clinical picture somewhat akin to the classical subacute combined degeneration may be brought about by chronic alcoholism gastric carcinoma obstruction or fistulae of the intestinal tract as well as pernicious anaemia. It may also possibly happen in pancreatitis pellagra and haemolytic icterus. As a basis for the present paper 77 cases have been studied in which there were signs of involvement of the posterior and lateral columns of the spinal cord and in which free hydrochloric acid was present in the gastric contents. It is necessary to emphasize that this latter finding eliminates pernicious anaemia altogether.

In these cases symmetrical, but persisting paraesthesiae of the hands and feet were noted just as in pernicious anaemia. There were 8 cases in which these symptoms were present.

The question of nerve involvement in sprue is of especial interest to tropical workers. In a review of more than 200 articles on sprue it was found that only in 20 was any evidence of organic involvement of the nervous system mentioned.

Gastric analysis revealed the presence of free hydrochloric acid in 52 out of the 93 cases of sprue and allied conditions studied. Neurological examination was performed in only 29 of these. In 6 of these cases there had been continuous parasthesias of hands and feet. In 6 the tendon reflexes were diminished and in 10 vibratory sense was impaired usually on both iliac crests or at the malleoli.

Macrocytosis was present in 8 cases. The neurological condition in one case (paralysis of the left peroneal nerve) was regarded as a complication not directly related to sprue.

The important neurological findings which may be occasionally observed in sprue and idiopathic steatorrhoea and which are dependent on organic involvement of the nervous system usually express themselves as persistent acro-parasthesias and impairment of vibratory sensibility. In one case of sprue only the clinical findings indicated subacute combined degeneration of the spinal cord, i.e. abdominal reflexes absent, Babinski, Chaddock, Rossolimo and Mendel-Bechterew reflexes strongly positive, definite incoordination of upper extremities and a moderate degree of astereognosis. These clinical findings disappeared after intensive intramuscular administration of liver extract.

[The reviewer in a clinical experience of 500 cases of sprue in the last 15 years has encountered two undoubted cases of subacute degeneration of the cord and in both these the appearance of the typical clinical syndrome presaged a fatal termination.]

P H M B

[Chaddock reflex is extension of the great toe on stimulation below the external malleolus. Rossolimo's is extension or abduction of the great toe when the plantar surface of that toe is stroked. Mendel's or Mendel-Bechterew's dorsal reflex of the foot: percussion of the dorsum of the foot normally causes extension of the second to fifth toes. In certain organic nervous conditions plantar flexion occurs. These are used to indicate lesions of the pyramidal tract.—Ed.]

BARKER (W. Halsey) Congo Red In the Treatment of Pernicious Anemia and Sprue—*Amer Jl Med Sci* 1937 Sept. Vol. 194 No 3 pp 293-303 With 7 charts.

In 1934 MASSA and ZOLEZZI announced the successful treatment of pernicious anaemia by intravenous injections of Congo red and in 1935 their observations were confirmed by MEROD and DOCK.

Congo red is a synthetic colloidal dye with a known chemical formula. It is employed in a 0.5 per cent. solution made up in 0.5 per cent saline solution. This solution is warmed almost to boiling point, allowed to stand for 24 hours and then filtered. Injections of 20 cc. of this solution are given every 1-2 days for 5-6 days followed by a rest period of several days.

RAYNER, in an attempt to substantiate the claims made for this treatment selected proven cases of pernicious anaemia on remission as the result of liver extract therapy. Weekly injections of Congo red

(Grübler) solution were substituted for intramuscular liver extract injections. The results are illustrated by tables and graphs. It became evident that five of the six patients evinced a marked tendency to relapse as shown by falling red count and haemoglobin as well as by rising mean corpuscular volume and colour index.

In four of the cases distinct symptoms of relapsing pernicious anaemia appeared concomitant with characteristic blood changes. These symptoms disappeared and the blood levels returned to normal when intramuscular liver therapy was resumed. Two cases of sprue were also treated in a similar manner. In both symptoms of the disease returned in an exacerbated form. The conclusion is reached that Congo red is totally ineffective in the treatment of pernicious anaemia or sprue.

P H M.-B

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## MISCELLANEOUS

SOREL (F) Les écoles de médecine de l'Afrique française [The Medical Schools in French West Africa.]—*Bruxelles Méd* 1937 Aug 22. Vol 17 No. 43 pp. 1528-1535

This paper gives an account of the medical schools at Dakar and Yaounde French West Africa in which are trained medical assistants midwives and health visitors.

After French rule in West Africa became firmly established it was soon realized that in order to provide a medical and health service adequate to the needs of the population it would be necessary to train local personnel. Financial considerations precluded the possibility of providing a large European staff and in any case it was felt that the trained native was the natural intermediary to convey new ideas to the mass of the people.

Useful lessons were learnt from the experience of the Medical School of Madagascar established in 1896. This school gives a four years course which includes 22 months general medicine 14 months general surgery 2 months midwifery and 2 months pharmacy. More than 700 diplomas in medicine and 400 diplomas in midwifery have been granted by the school. The training is scientific but the individual results have often been disappointing.

The Dakar School was founded in 1918. It was speedily realized that the instruction must be simple and practical and that it must be accompanied by moral training. The standard of education of the medical student is high. Selected candidates from secondary schools receive a higher education in general subjects and science usually at the William Ponty School at Dakar for a period of two years.

The medical course proper lasts for four years. Clinical teaching is given mainly in the wards. From eight to twelve beds are assigned to each student and they are required to make complete clinical records of all their cases. In the third year pharmacy is added and in the fourth year they take midwifery and gynaecology and ante- and post-natal work. On completion of their training they are usually posted for duty to their native colony. After six or seven years work in rural areas they return to Dakar for a refresher course.

There is ample clinical material for teaching as the native hospital at Dakar has 440 beds and there is also a maternity hospital of 60 beds and a polyclinic in the town with facilities for the treatment of tuberculosis gynaecology children's diseases and general medical and surgical cases. There is now a specialized teaching staff.

A centre was established at Ayos in the Cameroons in 1932 for the training of health assistants (*aides de santé*). They receive a three years course in anatomy and physiology nursing the rudiments of pathology and obstetrics and personal and communal hygiene.

Through the medium of numerous stationary and mobile dispensaries the medical assistants are doing good work in the control of epidemic and endemic diseases carrying out simple measures of hygiene and compiling health records in rural districts.

W H Peacock

HUARD (P) *Le climat et la pathologie de l'Afrique Orientale italienne. [Climate and Diseases of Italian East Africa.]—Ann. de Med. et de Pharm. Colon 1937 Jan.-Feb.-Mar Vol. 35. No 1 pp. 157-180 With 3 figs. [80 refs.]*

The author analyses a number of recent Italian papers concerning Eritrea and Italian Somaliland with a few references to Abyssinia—a list of them foots the pages.

In the description of the climate of Eritrea it is interesting to note that while the Italian press regards it as the worst in the world and compares it with the infernal regions GIORDANO a medical officer of the Italian navy writes that compared with many other tropical regions the climate is healthy provided that the rules of good hygiene are observed.

The infections and diseases are discussed with figures for various places. Helminthiasis is stated to affect 95 per cent of the natives. The incidence of hookworm varies from 16 to 50 per cent. [whether producing symptoms or not is unstated] While that of intestinal amoebiasis is given as 8-30 per cent the liver is rarely affected Venereal schistosomiasis has long been known in Italian East Africa recently the rectal form has been identified by SARRA in an autochthonous focus near Asmara. *Plasmodium falciparum* or a variety thereof was found in a neighbouring torrent. The opportunities of introduction into Italy are indicated. Malaria is common in Somaliland much less so in Eritrea Smallpox is a great scourge especially in Abyssinia, as figures show Other diseases discussed are louseborne relapsing fever typhus (common in the Abyssinian army no case among Italian soldiers) cerebrospinal meningitis dengue tuberculosis, mycoses, leprosy, venereal diseases, scurvy skin diseases, tropical ulcer snake bite.

A. G. Bagshere.

FEDERATED MALAY STATES. Annual Report of the Institute for Medical Research for the Year 1936 [LEWTHWAITE (R.) Acting Director]—pp vi + 157 1937 Kuala Lumpur Govt Press. [31 or 2s 4d]

During 1936 considerable progress was again made in the quality and quantity of routine services rendered to the Medical, Health, Police and several other Government Departments.

*Malaria*—Experiments designed to test the efficacy and safety of atabrin and quinine in clinical prophylaxis were continued by Dr J. W. FIELD. Clinical evidences of malaria under severe endemic conditions were almost eliminated by atabrin prophylaxis at an adult dosage of 0.2 gram on two successive days each week. "The risks appeared of low order but safety was not entirely assured." Half-dosage at 0.2 gram once a week was also tested, and an intermediate dosage is now under test. A summary is given of Dr J. C. NIXON's therapeutic test of atabrin-muonate in comparison with quinine on a carefully chosen series of 555 cases of acute malaria. It is felt that the use of atabrin-muonate should be limited to cases of acute malaria which cannot be satisfactorily treated orally. Injections of atabrin-muonate are relatively painless, while with injections of quinine there is a wider margin of safety. Treatment of some 50 cases of acute malaria by Dr C. GUEST with Malarene led to the conclusion that the drug is not a satisfactory remedy under local conditions. Promising results

have followed the therapeutic testing of Tablets of Quinine specially prepared by Mr A V HITCH. His aim has been to produce a quinine tablet combining the cheapness of the sulphate with the ready solubility and compact form of the hydrochloride.

*Typhus*—Tsutsugamushi disease is now considered identical with Rural Typhus by Drs. R LEWTHWAITE and S R SAVOOR who are now only using the former name.

From much experimental work on laboratory animals in attempts to prepare a prophylactic vaccine against Tsutsugamushi disease the most hopeful results to date have been attained by attenuation of the virus by photodynamic action. Immunization of a horse with ordinary virus has been followed by a positive Weil Felix (OAK 1200-1300) but so far prophylactic value of the serum has not been demonstrable. Transmission experiments with insect vectors have been continued and have indicated that transmission of Tsutsugamushi virus by the tick *Dermacentor andersoni* and flea *X. cheopis* and of urban typhus by the tick are unlikely to be of epidemiological importance. During these experiments an accidental infection with *Spirillum minus* was found to be associated in rabbits with a positive Weil Felix (OAK) reaction. Experiments were also designed and made to see whether rats rendered immune to the virus of urban typhus if re-infected could transmit the virus to fleas and possibly thus maintain the virus in nature. Rat brain and spleen were found non infective a month after infection and no virus could be demonstrated in fleas fed on rats which had been re infected after a 6 months interval. Oral transmission by a method simulating cannibalism was successful in only 1 out of 9 experimental white rats and further propagation of that infection failed although four passages were made in the hope of thus exalting the virulence of the transmitted virus.

*Bacteriological*—The various coliform organisms found associated with pvelitis are under investigation by Dr R GREEN. Screw-capped bottles for many culture media have been introduced with great success. A list is given of cultures available in stock. This may be of considerable service to bacteriologists in the East. A grant from the Palm Oil Producers Association of Malaya has enabled an investigation to be started by Dr J T PARANJOTHY on the efficacy of various rat viruses.

*Chemical* (Mr R. W. BLAIR)—Great advances are recorded in the chemical treatment of the chief water supplies. Attention is drawn to the danger to public health of water probably of doubtful purity added surreptitiously to milk. Apart from 129 out of 875 milk samples which failed to comply with the legal standards (8½ per cent. milk solids other than fat and 3½ per cent of milk fat) there were another 24 samples which barely complied with the legal standards and which as a result of determination of the freezing point were reported against as containing considerable added water. Dr I A. SIMPSON found that Malayan Palm Oil appeared richest in carotene pigment when obtained of low acidity from fully ripened fruit [see *Bull of Hyg* 1937 Vol. 12 p 294].

*Entomological*—An investigation of filariasis has been started in the Sabak Bernam peninsula and also a study of the transmission of *Microfilaria malayi* by Mr E P HODGKIN in collaboration with Dr J J C BUCKLEY of the London School of Hygiene and Tropical Medicine. The newly-opened padi area has been found to be already infected. Of a number of possible carriers tested the various species of

Moreover a disease was set up in mice by the direct inoculation of blood from a human patient characterized by the presence of large numbers of typical rickettsiae in splenic films thus leaving no doubt that the disease in man guinea-pigs and mice is caused by the same virus. The rickettsial bodies are present in such large numbers in the mouse's spleen that it is possible to prepare by suitable centrifugation, a suspension for agglutination purposes. In this way it was found that the serum of convalescent patients contained agglutinins for the Q Rickettsia but not for any of the *Proteus* \ group of bacteria.

The organisms themselves look like tiny rods 1.0 $\mu$  in length and about 0.3 $\mu$  in width. Their shape varies from well marked rods to coccoid bodies indistinguishable from those of psittacosis. With Giemsa's stain they are reddish-purple in colour with Castaneda's stain some are pale blue and others are pink. They appear to grow in the form of intracellular colonies but in any smear a proportion will be found to be extracellular. Though constantly present in the mouse they have never been found in the tissues of the guinea-pig. Filtration experiments show that the virus can pass through gradocol membranes with an average pore diameter of 0.7 $\mu$ , though the concentration of virus in the filtrate is very low. White rats are susceptible but less so than mice.

The differentiation of Q fever from other rickettsial diseases is discussed. It is concluded that the Q virus is a new type of Rickettsia because (1) there are no antibodies to \19 or \A in man or rabbits (2) the morphology of the intracellular microcolonies in the spleen and liver cells of the mouse is different from that of any known type of Rickettsia. [It is not quite clear why the authors regard this organism as belonging to the Rickettsia rather than to the filtrable virus group. The facts that in its filtrability it resembles the vaccinia virus, and in its cytoplasmic microcolonies the psittacosis virus taken with the complete absence of even group agglutinins to any of the *Proteus* \ group and the failure hitherto to find an insect host suggest that till further evidence is forthcoming the rickettsial nature of the virus should be accepted with reserve.]

G. S. Wilson.

MANSION-BAHR (Philip) BIGGAM (A. G.) Sigmoidoscopy in Tropical Practice.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937 April 19 Vol. 30 No. 6 pp. 549-558 559-563. Discussion pp. 563-564.

At a meeting of the Royal Society of Tropical Medicine and Hygiene on February 18th, 1937 papers were read on sigmoidoscopy in tropical practice. The subject is of considerable practical importance in tropical medicine and in addition to an abstract of the papers, a short account of the discussion which followed is appended.

In his introductory remarks Dr Manson-Bahr dealt with the technique of sigmoidoscopy and emphasized its value in tropical practice. In the local examination of the anus and rectum the left lateral position proved the most comfortable, but in very short or particularly muscular patients, the knee-elbow position was preferable. The dorsal or lithotomy position was the one most usually adopted—especially in elderly and obese patients.

Before inserting the instrument an inspection of the perianal skin should be made and the orifices of fistulae searched for. A leucoplakic condition of the skin was not uncommonly found in chronic bacillary

dysentery and sprue. Digital examination of the anus and rectum should proceed insertion of the instrument otherwise thrombosed piles or small carcinomatous ulcers might be missed during the rapid extrusion of the instrument by the anal sphincter at the end of the examination.

The indications for sigmoidoscopy were summarized as follows.

- (1) A history of rectal pain, tenesmus, chronic diarrhoea or mucopurulent or blood-stained stools.
- (2) Haemorrhage from the anus which is not attributed to piles.
- (3) Constipation alternating with false diarrhoea.
- (4) Chronic diarrhoea which does not yield to simple medical treatment.
- (5) Blockage of the bowel due to some obscure obstruction.

In preparing patients for sigmoidoscopy  $\frac{1}{4}$  to  $\frac{1}{2}$  oz. of castor oil was advocated not later than 2 p.m. on the day before the examination followed by lavage of the bowel with hot water next morning.

Tincture of opium (5-15 min.) or morphia (grain  $\frac{1}{4}$ ) may be given beforehand to lessen discomfort and pain. Luminal (grains 1-2) often proved useful in nervous patients.

Pathological studies indicated that in 80 per cent. of amoebic infections the rectum was first involved. Sigmoidoscopy naturally provided an easy method of inspecting the earliest lesions. The site of the submucous burrowing of *E. histolytica* is indicated by small yellowish elevations or papules. These, on rupturing, produce amoebic ulcers which appear as small red depressions up to 5 mm. in diameter usually having a haemorrhagic margin. Petechial haemorrhages are generally found in the vicinity. Between individual ulcers the mucous membrane is singularly unaffected and its folds are more lax and reticulated than in the normal subject. This is in marked contrast to the contracted, rigid and stenosed appearance commonly encountered in the chronic stage of bacillary dysentery. Occasionally individual amoebic ulcers up to 1 cm. in diameter may occur in the sphincteric region or on the columns of Morgagni simulating malignancy. Hyperplastic granulomata of amoebic origin have also occasionally been mistaken for carcinoma. Another rare acute lesion is an amoebic proctitis in which there is excoriation and general destruction of the mucosa resembling that seen in bacillary dysentery.

In chronic amoebic dysentery where *E. histolytica* cysts are present in the faeces lesions are less easily detected and consist of very minute depressions or pits which can only be distinguished by the use of a magnifying eyepiece. The mucosa in these cases appears superficially pock marked or as if nibbled by microscopic mice, the pittings being produced by scars left by the healing of small ulcers. They are the only lesions usually visible in symptomless carriers or cyst passers. Scraping of any suspected amoebic lesion for subsequent microscopic study should be made with a Volkmann's spoon. In acute cases vegetative forms are readily found in such scrape preparations but in the chronic pittings amoebae are scanty or have disappeared.

Following combined emetine-bismuth iodide and yatren treatment healing is extraordinarily rapid and within 12 days granulations fill up the small ulcers and epithelium covers the depressions. All that can be seen at the site of former ulcers are small pink spots which are redder than the normal mucous membrane.



In chronic bacillary dysentery sigmoidoscopy is a most important aid to diagnosis since isolation of dysentery bacilli is rarely possible and the agglutination test is by no means always helpful. Here the bowel wall is rigid and inelastic while the surface of the mucosa is granular and of a carmine or rose red colour. It is easily traumatized and there is usually surface-oozing on withdrawal of the instrument. Fibrotic scarring of the surface and pseudo-polypoid are sometimes seen and partial stenosis of the bowel may be encountered.

In sprue sigmoidoscopy shows the mucous membrane of the bowel to be ridged, folded and easily traumatized. It is very finely granular on the surface and cherry pink in colour. The intestinal mucus is sticky and adherent whilst typical yellowish or white sprue faeces pour down the lumen of the bowel. In advanced cases when atrophy has taken place the mucosa is lax, pale yellow in colour and parchment like.

In conclusion the author recorded that during the past 16 years out of 3,063 sigmoidoscopies made by the Staff at the Hospital for Tropical Diseases, stenosis or stricture of the rectum had been found in only 24 cases. Seven were attributable to chronic bacillary dysentery, five to chronic amoebic dysentery, two to ulcerative colitis, and two to lymphogranuloma inguinale. The remainder were due to other causes such as carcinoma (5), syphilis (1), gonorrhoeal proctitis (1) and polyposis (1).

Lt-Col. A. G. BIGGAM said the best preparation was a low residue diet on the day preceding the examination and an ordinary soap and water enema followed by an alkaline wash-out next morning. Preliminary purgation should always be avoided. The right lateral position was the most comfortable for the patient, and during the insertion of the instrument gentle inflation to open up the lumen of the bowel was necessary. The healthy mucosa appears pink and glistening resembling the inner side of the cheek.

In bacillary dysentery where the patient had not been seen until the fifth day of onset isolation of a specific organism might not be impossible. Here instrumental examination was of great importance. In very acute cases the gut wall was oedematous, rigid and often difficult to dilate, the necessary air pressure causing considerable pain. The mucosa was cherry red in colour, bled readily on slight trauma and the lumen of the gut generally contained mucus and blood. Ulceration, if present, was superficial and surrounded by inflamed mucosa—a finding which was in marked contrast to amoebic ulceration. In fulminating Shiga infections where coagulative necrosis had occurred, the mucosa was greyish-green in colour. In mild cases of bacillary dysentery the degree of inflammation was much less and was often limited to irregular patches mainly disposed transversely in the direction of the folds of mucous membrane. Ulceration was infrequent and blood and mucus were scanty.

Subtertian malaria infection of the bowel through capillary obstruction sometimes produces acute dysenteric symptoms with blood and mucus in the stools indistinguishable from bacillary dysentery. In the milder cases the mucous membrane merely showed a diffuse or patchy hyperaemia, but in the more severe a generalised hyperaemia with scattered haemorrhages was seen. Occasionally superficial necrosis was evident which might be patchy or generalised in distribution. Recognition was difficult by sigmoidoscopy alone.

and examination of blood films was generally necessary before a diagnosis could be made.

In amoebic ulceration the characteristic appearances were the discrete nature of the ulcers and the healthy intervening mucous membrane. Typical amoebic ulcers may sometimes be missed unless mucus adherent to the ulcer base be washed away. In severe cases which simulate bacillary dysentery clinically extensive destruction of the mucosa ensued only small islands of healthy tissue surviving between large ulcerated areas. Valuable information in regard to the effects of specific drug treatment in the healing of amoebic lesions can be obtained by sigmoidoscopy. On recovery the healing process was complete and nothing remained to indicate the previous site of ulcers even when the area affected had been very extensive.

In schistosomiasis caused by infestation with *S. mansoni* the earliest recognizable change was a patchy hyperaemia of the mucosa. Here and there more intensely hyperaemic areas not elevated above the surface could be discerned. Later these may become elevated and finally polypoid masses formed. Degeneration results in ulceration of these papillomata. Following tartar emetic therapy the early lesions disappeared but where they had progressed to the polypoid stage resolution did not occur. In the latter type of lesion dysenteric symptoms might persist for years. Local treatment was then essential and many polypi could be removed through the sigmoidoscope by electric cautery or diathermy.

In the discussion which followed Dr C. C. CHESTERMAN said he was particularly interested to hear Colonel Biggam describe the papillomata associated with infestations with *S. haematobium* as flat and non-pedunculated. In the new species of schistosome in the Congo (*S. intercalatum*) which also deposited terminal-spined ova in the bowel, no such lesions had been noted by either Dr FISHER or himself.

Dr A. HAMILTON FAIRLEY pointed out that preparation for sigmoidoscopy involving the use of aperients or cleansing enemata often altered the appearances of the mucosa and lead to congestion and hyperaemia. The surest index to inflammation was the presence of bleeding when the mucosa was swabbed. Amoebic ulcers as seen by the sigmoidoscope were easily identified, but the recognition of amoebic granulomata and diffuse amoebic proctitis presented great difficulty. In all these types of lesions scrapings should be made and examined microscopically as vegetative *E. histolytica* were then readily demonstrated. Sigmoidoscopy was of value in both tropical and non-tropical causes of blood and mucus in the stools but in his experience instrumental examination rarely revealed findings of tropical interest unless cellular exudate was present in the stools on microscopical examination.

Dr GOLDBERGER insisted that proctosigmoidoscopy should be practised by every physician investigating bowel trouble. He then described his own special instrument which by means of a telescope gave a magnification of ten diameters. It could be passed 35 cm. up the bowel and was of special value in revealing structures.

Dr Manson-Bahr in reply said that definite puckering did sometimes follow the healing of amoebic ulcers. This was the only point on which he was at variance with Colonel Biggam.

A. Hamilton Fairley

WEINER (J. S.) Report on Heat Stroke Heat Collapse, etc.—*Central Mining—Rand Mines Group Health Dept Rep Year 1936 together with a Review of the Work of the Department since 1914* Annexure 2, pp 74-113 With 29 figs. [20 refs.] [Summary appears also in *Bulletin of Hygiene*]

This interesting report summarizes the results of investigations of the effects of high temperatures on Bantu workers recruited for the Rand Gold Mines. The subjects were exposed in a heat chamber to the severe conditions of 96°F dry bulb and 95°F wet bulb and their reactions studied both when resting and when working.

In 70 subjects the physiological adjustment of the heart and circulatory system was studied. Such adjustment entails the maintenance of a higher pulse rate and pulse pressure. In subjects working in the hot chamber the increases in pulse rate and pulse pressure over the values determined when the subjects rested in a cool environment corresponded to the sum of the increases found (a) when working in a cool room, and (b) when resting in the hot chamber. In natives who had to be withdrawn from the chamber after having reached the limit of their endurance the pulse rate was markedly accelerated while in heat collapse the pulse is weakened and slow.

The reactions accompanying experimentally induced heat collapse were studied in a number of subjects. Collapse is attended by a slowing of the heart rate from 160 beats per minute to 90-60, a fall in the systolic blood pressure and a much diminished pulse pressure. There is no abnormally high body temperature, nor is there increased sweat production or increased rate of respiration. The use of a test of circulatory efficiency (the Schneider test) did not make it possible to predict the liability of a subject to collapse and when collapse did occur the circulatory efficiency as indicated by the test was not greatly diminished. Recovery takes place quickly when a collapsed subject is allowed to lie down in a cool environment.

Whether the subjects rested or worked, one hour's exposure in the hot chamber resulted in an acidosis as indicated by a lowering of the alkali reserve, hyperpnoea, a decreased pH of the urine, an increase in urinary ammonia, as well as a decrease in the base bound as bicarbonate and an increase in titratable acid in the urine. With prolonged exposure an alkalosis develops secondarily, this may be looked upon as a protective process since heat-stroke is accompanied by acidosis. Exposure to heat also caused dilution of the blood as shown by the haemoglobin concentration. The percentage of blood sugar fell initially and later tended to rise.

In four cases of heat stroke the plasma alkali reserve was observed to be comparable with that found in severe diabetic acidosis. The urinary pH in these cases was on the acid side and all the subjects exhibited hyperpnoea. Treatment for heat stroke should be directed towards reducing the body temperature by cooling (preferably by cool air) and the acidosis should be treated by the intravenous injection of bicarbonate solution. In two serious cases of heat stroke the patients were each given about 300 cc. of 2½ per cent bicarbonate solution and both patients recovered.

Bearing on the subject of heat cramps the chloride and water loss in the sweat of the subjects working and resting in the heat chamber and the resulting concentrations of salt in the blood and urine are reported. The chloride concentration in the sweat varied much

in different subjects but in the majority the sweat chloride was below plasma level. There was no restriction of urinary output of chloride. From these observations and from others on two subjects working underground it seems likely that the total salt loss during a mining shift is compensated for by the salt contained in the ordinary mine diet and this probably explains the absence of heat cramps in the humid mines of the Witwatersrand.

Heat tolerance was assessed by means of the heat chamber test devised by DREOSTI [*Bulletin of Hygiene* 1936 Vol. 11 p 747]. The heat tolerance depends on the magnitude of the rise of mouth temperature when the subject works at a set task for one hour in an atmosphere at 96°F dry bulb and 95°F wet bulb. Mr Weiner has studied the relation between heat tolerance assessed in this way and various bodily characteristics. No correlation coefficients are given but from the tables there appears to be no clear relationship with the initial mouth temperature with the vital capacity or with the sitting or standing height. The figures suggest that heat tolerance may be associated with age pulse rate and systolic blood pressure but in no case does the relationship appear to be very close. *T Bedford*

STOTT (H) Heat Exhaustion and Dehydration in the Arabian Desert.—  
*Indian Med Gaz* 1936 Dec. Vol. 71 No 12. pp 712-714

This striking article records the sufferings of the passengers and crew of the aeroplane *Horsa* which made a forced landing in the Arabian Desert in August 1936.

The temperature in the shade of the wings where the passengers lay was 125° or 130°F from soon after sunrise to sunset. The air humidity was extremely low. There was a continuous but hot and dry breeze.

The clinical symptoms produced were those of heat exhaustion and dehydration. Faintness and giddiness were first in evidence followed by signs of severe cardiac collapse—cold skin weak pulse and cyanosis. Owing to rapid evaporation the skin did not become damp.

The clinical results of dehydration resembled generally those of cholera—a bone-dry skin sunken dark-rimmed eyes hollow cheeks and greatly diminished secretion of urine. The mental drowsiness which all felt the dyspnoea which affected many and the bouts of Cheyne-Stokes respiration occurring in some were probably caused by toxic metabolic products retained through the suppression of urine.

The account is written in a most graphic style.

*W P MacArthur*

VASSALLO (S M) Duodenal Ulcer in Zanzibar—*East African Med J*  
1937 June Vol. 14 No 3 pp 83-88

The author finds that duodenal ulcer and pyloric stenosis are not rare in non Europeans in Zanzibar. He thinks that hookworm may have a share in the causation. Treatment is surgical. Of 1837 major operations performed by the author in Zanzibar duodenal ulcer (or its manifestations) was found in 175 instances. The subjects were Indians Arabs and Swahilis the last term including several "mainlanders" particularly Mwanyamwezi. In only one of three Goans was the diagnosis confirmed by operation. Only 6 of the 175 were women.

who come to hospital with some reluctance and with still more to the operation table.

The author thinks that diet has some relation to the disease. In persons affected with hookworm the mimicry of duodenal ulcer is complete they show tenderness over the pylorus, hunger pain and periods of intermission. He surmises that following a persistent hookworm infestation changes may develop in the pylorus passing on to ulceration. If the pains do not pass after treatment by Ol. chenopodii a barium meal is given and if ulcer is revealed operation is advised. No less than 35 of the 175 had pyloric stenosis and 10 of these were apparently not older than 30 years. The classical syndrome of duodenal ulcer is rare in Zanzibar the ulcers are large with many adhesions there is constant pain and often wasting owing to lack of treatment. Gastric ulcer has not been seen in non-Europeans.

Dietetic treatment owing to want of their co-operation is inapplicable to native races. The author did posterior no-loop gastro-jejunostomy with excellent immediate results (4 deaths in the series of 175 cases). Formerly late results being less good he now does a partial gastrectomy removing the 'ulcerable' area.

The editor has collected notes on peptic ulcer from other parts of East Africa. At Kampala there were 30 cases in a total of 7019 operations at Nairobi 22 cases of peptic ulcer in five years, half of which were duodenal. At Dar-es-Salaam, Mombasa and Nyasaland the condition was still rarer.

A G Bagshawe

KOUWENHAAR (W.) Enterogene beri-beri. [Enterogene Beriberi]—  
*Geneesk. Tijdschr. v. Nederl. Indië.* 1937 Sept 7 Vol 77  
 No. 36 pp 2135-2142.

In this clinical lecture the case of a woman with certain symptoms is made the text for a discussion of enterogenic beriberi. The patient was a European, 47 years of age who complained of difficulty of walking, with a sense of weight and weakness in the limbs. Her knees in walking had to be raised to prevent the feet from scraping the ground. Heart symptoms and loss of appetite were also complained of. She had never been strong had had amoebic dysentery and cystitis, and was in receipt of a protein poor diet for stubborn skin disease. Clinical examination showed diarrhoea, polyneuritis, oedema, some heart symptoms and hypoaesthesia of the feet but the tender reflexes were still present. The diagnosis made was enterogenic beriberi. Although meat fish eggs cheese, peas and beans were excluded from her diet that diet could not be said to be deficient in vitamin B<sub>1</sub>. It included salads potatoes, fruit milk etc.

The subject is taken up of relative conditional vitamin deficiency due to abnormal conditions in the gastrointestinal canal and defective absorption, even although there is no deficiency of vitamin B<sub>1</sub> in the food. reference is made to the curative action of this vitamin in quite a number of diseases in which polyneuritis is a prominent symptom. A tendency exists to describe these diseases as a form of simple B<sub>1</sub> avitaminosis and further research into the question is desirable.

The treatment recommended for the patient was administration of sufficient vitamin B<sub>1</sub> parenterally because of the gastro-intestinal

disturbance. Then the enterocolitis had to be treated and the diet suitably altered. If a more liberal diet was barred by the presence of the skin disease then the deficiency in vitamin would have to be made good in the form of tablets. Evidently this treatment was carried out and the ship's doctor reported such great improvement in the paralysis of the limbs and the diarrhoea that the patient arrived in Holland from the Dutch East Indies practically cured. W. F. Harvey

ELLINGER (P.) HASSAN (A.) & TAHA (M. M.) Pellagra in Egypt.—*Lancet* 1937 Sept 25 pp 755-758 [16 refs.] [Summary appears also in *Bulletin of Hygiene*]

This paper contains a preliminary report of the results of recent investigations on pellagra in Egypt. These covered the relative frequency, the seasonal incidence, the distribution between sexes, ages and trades, the dietary history and other contributory causes as well as the clinical symptoms of the disease including porphyrin excretion.

The conditions in Upper and Lower Egypt differ considerably. In Lower Egypt in a random sample of population totalling 204 persons 14 of 35 boys (40 per cent), 5 of 10 girls (50 per cent), 46 of 127 male adults (36 per cent) and 5 of 32 adult females (16 per cent) showed signs of pellagra with no definite relationship with occupation. [With this high incidence 34 per cent it is rather surprising to learn that there are no official statistics of pellagra in Egypt.] Three-quarters of the pellagrins and one-third of the non pellagrins were subsisting on pure maize bread. A hot meal of vegetables cooked in oil or fat is taken in the evening.

It is worthy of note that among clinical symptoms skin lesions were noted on pressure points but never in the neighbourhood of the genitals. Angular stomatitis however occurred in 68 per cent. Only three cases showed signs of subacute combined sclerosis and none mental symptoms. Anaemia as estimated by inspection of conjunctiva and buccal mucous membrane was present in 60 per cent pellagrins and 43 per cent non-pellagrins doubtless due to heavy helminthic infections.

In Upper Egypt pellagra is rare and little definite information was collected but lesions of the nervous system were much more common than in the Delta. The diet is different from that in Lower Egypt in that it is more varied and the bread is made of maize only from December to March at other times from barley or millet. Parasitic infections are much less common. The pellagra season begins in November with a maximal incidence in January, February and March.

In consequence of the interest reawakened by the observations of BECKH, Ellinger & SPIES upon porphyrinuria in pellagra (*Quarterly J Med* 1937 Vol. 23 p 305) porphyrin excretion was estimated in Egypt. In almost all the pellagrins examined there was an increased excretion but in a high proportion of the non pellagrous villagers there was also abnormal porphyrinuria. This is attributed to the parasitic infection.

Pellagra in Egypt appeared to result from two concomitant but independent factors: malabsorption due to parasitic infection of the intestines and malnutrition due to a diet insufficient in the vitamin-B<sub>3</sub> complex caused an increased formation, circulation, and excretion of porphyrins—a condition of latent pellagra. In such people the onset

of active pellagra is precipitated by very hard physical work, especially in the open air by intensive exposure to sunlight, or by febrile infectious diseases."

[It should be realized that such a statement is at the present time theoretical and it is going too far to state as is done elsewhere in this paper—"This sensitiveness (of the skin) to light is caused by porphyrins circulating in increased concentration in the blood. It has not actually been proved.] *H S STANNUS*

CLARK (A.) Notes on Pellagra in Egypt, 1936-37.—*Jl Trop Med. & Hyg* 1937 Oct 1 Vol. 40 No 19 pp 221-226. With 2 charts.

A description of the conditions of life of the fellahin in Lower Egypt followed by a restatement of the arguments in favour of looking upon pellagra as an upset in metabolism caused by hydrocyanic acid in foodstuffs which robs the tissues of their sulphur content with the overproduction of thiocyanates. Dr Clark believes that maize and the large millet both of which he includes under the name "durra," produce prussic acid and in such amounts as to be the cause of this disturbance in metabolism. *H S STANNUS*

TROWELL (H C.) Pellagra in African Children.—*Arch Dis. Childhood* 1937 Aug Vol. 12 No 70. pp. 193-212. With 3 figs. [40 refs.]

During the past few years a number of papers have appeared describing conditions among African children under various designations of uncertain aetiology. In summarizing these papers individually and later collectively the reviewer suggested that these conditions were all of a pellagrous nature. In the present article Dr Trowell gives a most excellent account of the disease based on observations made upon cases observed at Nairobi Hospital, Kenya during 1934-5. The condition is dealt with from all points of view and his paper forms the best account of the affection yet published, deserving of being read by all those practising in tropical Africa.

Dr Trowell now pronounces the condition to be definitely pellagra, though it is interesting to note he has not observed this disease in the adult population. No attempt will be made to summarize this paper—it must be read in full.

Some observers have attempted to find some affinity between this African disease and pink disease of European children. It is interesting to observe that the author says the differences between pink disease and infant pellagra are more obvious than the similarities.

*H S STANNUS,*

- I. MOORE (D G Fitzgerald) Retrobulbar Neuritis cum Avitaminosis followed by a Post Partial Optic Atrophy—now shown to be of a Pellagrinous Nature. Its Serious Incidence and its Need for General Investigation.—*West African Med Jl* 1937 June. Vol. 9 No. 2 pp. 35-40. [17 refs.]
- II. DODDS (G E.) Report upon a Case of Pellagroid Avitaminosis.—*Ibid.* p. 40 With 7 figs.

i. Some time ago Dr Fitzgerald Moore called attention to a form of retrobulbar neuritis in natives of West Africa associated with a diet

of cassava. He now points out how widely spread is the affection and that it presents a problem of considerable economic importance. Sixty per cent. of some 3 000 visual defectives seen in eighteen months were of this nature. The signs are those of a true optic neuritis followed if untreated by atrophy in many who recover their vision there is some persistent residual defect. Treatment by sulphur ichtyol thiosulphate etc. is ineffective on the other hand response to marmite is most satisfactory.

Dr Moore now considers the condition to be part of a pellagrinous syndrome and refers to a number of papers on similar conditions without reference to the articles in this *Bulletin* in which all these conditions were brought together and discussed.

ii Report upon a typical case.

H S Stannus

TSCHILOW (Konstantin) Kombination von Hungerödem mit Pellagra [Hunger Oedema in Association with Pellagra].—*Wien Klin Woch* 1937 Oct 15 Vol 50 No 41 pp 1422-1423 With 2 figs

A report on a case of hunger oedema in association with pellagra occurring in the person of a 52 year-old male in Sofia. That oedema occurs in certain of the avitaminoses such as beriberi and scurvy for example is well known but the author says he has failed to find in the literature any case analogous to his own. Treatment by means of lactovitellin and laktosin was successful. [Cases of pellagra with oedema have received notice in this *Bulletin* from time to time in the past two years see 1936 Vol. 33 p 821]

H S Stannus

PETRI (Svend) WANSCHER (Oscar) STUBBE TEGLEBJAERG (Else) & STUBBE TEGLEBJAERG (H P) Om behandling af pellagra med ventrikelpreparater og om lidelsens gastrogene ætiologi samt beslaegtethed bl a. med polyneuritis. [Cases of Pellagra treated with "Ventriculin."—*Hospitalstidende* 1937 July 13 Vol. 80 No 28. pp 817-840]

This report is of team work carried out partly at the Pathological Institute of the Municipal Hospital in Copenhagen partly at the mental hospital Filadelfia which provided the six cases of pellagra studied. They were all cases of depressive psychoses in women who in spite of a normal dietary had developed characteristic secondary pellagra. The authors have rung therapeutic changes in their treatment of pellagra on neutralized human gastric juice, raw pressed out pig's gastric juice and ventriculin which is a Danish preparation of pig's stomach dried de-fatted and pulverized. Their therapeutic successes were scored almost exclusively with the last named which acted like a charm in all six cases banishing every sign of pellagra within two months or less of the beginning of treatment but having no uniformly beneficial effect on the mental disease. From a survey of the literature and of their own experiences the authors conclude that pellagra is not always amenable to dietetic treatment alone however complete and vitamin rich the food may be. Again pellagra may disappear without any change in the composition of the food or even on a so-called pellagra promoting dietary. It is therefore difficult to



accept the theory that pellagra is due to a deficiency of vitamin B<sub>3</sub>. The authors' clinical experiences and observations on gastrectomized dogs has led them to believe that the determining factor in the genesis of pellagra is some change in the functions of the stomach. They also develop the theory that a whole group of diseases such as pernicious anaemia, pellagra and polyneuritis have so many cardinal features in common that their aetiology may conceivably be traced to one and the same factor dependent on the stomach's functions. They admit, however the lack at present of a biological method for the demonstration of this factor which they hold responsible for what they describe as a gastrogenic, neuro-cutaneous symptom-complex.

C. Lithington

BLACKIE (W. K.) Onyala: a Review.—*Trans Roy Soc Trop Med & Hyg* 1937 July 31 Vol. 31 No. 2. pp. 207-226 [22 refs.]

In this interesting paper which is more than a review Dr Blackie comes to the tentative conclusion that onyala is an acute form of essential thrombocytopenia due to defective maturation of the megakaryocytes of the marrow and that a contributory cause in the production of the haemorrhagic bullae is an associated modification of the capillary endothelium.

The term onyala was introduced by WELLMAN as that of a dangerous haemorrhagic disease of the highlands of West Central Africa, characterized by the formation of blood-filled bullae in the mucous membrane of the mouth and elsewhere, from which free and often fatal haemorrhage occurs. The term is unknown in Rhodesia where the author's study was made—here the disease is called "chilopa" or "akembe" in Northern and Mbuka and maringa in Southern Rhodesia. The diseases described by MENGE as "kafindo" and edyno are probably different from onyala.

Onyala occurs in Angola and Portuguese West Africa, on the Lualaba river and near Mount Kenya as well as in the Rhodesias and is not met with outside Africa. The cause is unknown: there is no evidence of infection. Whereas in Rhodesia bleeding from the mouth and nose is the chief feature, in Portuguese West Africa it is haematuria. The clinical characters are described. A feature of the graver type of disease is the occurrence of physical signs of broncho-pneumonia probably due to the presence of small haemorrhagic areas (H. H. Soorri). A fatal case of cerebral haemorrhage with a haematoma over the temporal region led to the supposition of a murderous assault, negatived, however by the finding of the characteristic bullae. The most effective treatment is that introduced in 1928 by MORRIS. It consists in the intramuscular injection of 18 cc. of donor's blood with 2 cc. of 10 per cent. sodium citrate—most patients require two injections, some as many as five or six. Blood transfusion is seldom necessary. Autohaemotherapy has not proved of value. An account based on two cases is given of the post-mortem findings.

Laboratory Findings.—The author gives a study with tables of seven cases, one fatal, admitted to the Salisbury Native Hospital in 1935. The reduction of red cells is rapid, it is ascribed to loss of blood from mucous surfaces and haemorrhagic infiltration of tissues and organs. The characteristic feature of the blood film is the anisocytosis. The anaemia is of the normochromic type met with in any acute haemorrhage. The reticulocyte count is low in the initial stages.

There is a remarkable reduction of circulating platelets at the onset whereas in the normal subject the numbers range between 250 000 and 500 000 per cmm in six cases of onyalaï it lay between 20 000 and less than 1 000. With this was associated a marked prolongation of the bleeding time 2-5 minutes in healthy natives it varied in the six cases investigated between 14 minutes and 2 hours 40 minutes. The coagulation time was within normal limits. The capillary resistance test (Hess) was positive in the five cases tested the haemorrhagic spots can be seen in the dark-skinned native if the skin of the cubital fossa and wrist is cleared by means of clove oil. As regards the white cells there is leucopenia with reduction of neutrophils and relative increase of mononuclears. For one case are given the haematological findings over a period of 25 days. Here on December 2nd the platelets numbered 1 750 per cmm on December 3rd became 106 500 and on December 6th 229 000. The rise preceded the cessation of haemorrhage. The maximal response in the reticulocyte percentage does not occur until 3-6 days after cessation of haemorrhage. A table gives observations on the biochemistry of the blood. The Wassermann was negative in four cases tested. The results of urine examination are tabulated red cells were seen in all but one of the seven. Blood and faeces were examined for parasites present in one instance in the faeces (*T. saginata*).

The nature of onyalaï is discussed. There are found (1) A marked thrombocytopenia (2) a prolongation of the bleeding time (3) a normal coagulation time (4) imperfect clot retraction (5) a positive capillary resistance test.

These findings place onyalaï among the purpuras showing thrombocytopenia. There is no evidence of defect of marrow or spleen such as is associated with symptomatic thrombocytopenia and the conclusion reached is that onyalaï is an acute form of essential thrombocytopenia. It is suggested that this deficiency is due to defective maturation of the megakaryocytes. An intra muscular injection of whole blood replaces the factor required for maturation platelets are budded off and their numbers rise abruptly.

A G Bagshawe

[It is hoped that Dr Blackie will continue his researches on this puzzling condition. The above constitutes a big advance in accounting for its pathogeny but does not explain the peculiarly limited localization to Rhodesia (and possibly Angola and the Congo). There must be some other basic element in the aetiology yet to be discovered. —Ed.]

SARNELLI (Tommaso) Considerazioni cliniche e anatomopatologiche su dei casi di leucoderma osservati in Arabia. [Two Cases of Leucoderma observed in Arabia.]—*Giorn Ital di Clin Trop* 1937 Aug 31 Vol. 1 N.S No 8 pp 234 237-9 241-3 With 7 figs.

Both the patients whose conditions are described were seen in Sanaa in the uplands of Yemen. The picture was in each case typical clinically as shown by photographs reproduced. The article is illustrated also by line drawings showing the histology of the normal skin, a part demonstrating a stage intermediate between this and the achromic stage, and a third depicting an achromic area under higher magnification.

H H S

GOODMAN (Herman) An Insecticide (Flit) as a Cause of Dermatitis. Report of a Case of Eighteen Months Duration in which the Husband was the Carrier.—*Arch. Dermat. & Syph.* 1937 Sept. Vol. 36 No 3 pp 611-612.

"Flit" is an insecticide much in vogue in the tropics (and probably elsewhere) and is used also as a spray for keeping away mosquitoes. The following case is consequently of interest to practitioners in warm climates. A woman of 37 years consulted the author for a widespread cutaneous eruption affecting almost the entire body. In spite of many forms of treatment suggested by medical men and laymen, some of which seemed to give a little temporary relief at first, the lesions had persisted for 18 months. The cause was traced to Flit which had been freely used once a week or oftener for spraying the house furniture and in particular the beds. This woman was proved to be unduly susceptible in fact allergic to it other members of the family not being affected in the same way. The bedding retained sufficient to lead to recrudescence after the use of "Flit" was stopped, and finally bed linen blankets, pillows etc. all had to be sent to the cleaners, and carpets removed, before the trouble ceased.

H H S

SIMSON (F W) & STRACHAN (A Sutherland) Rhinosporidiosis in Man, with a Report of Five Cases occurring in the Union of South Africa.—*South African J. Med. Sci.* 1937 July Vol. 2 No 3. pp 82-88. With 3 figs. [34 refs.]

Rhinosporidiosis has been reported in India, Ceylon, the Argentine, the United States and the Philippines. The authors here record briefly notes of five human cases in South Africa, two Europeans and three natives, in whom the conjunctiva was affected [see also MANDLIK, this *Bulletin* 1937 Vol. 34 p 813]

H H S

ELLIS (M) A Case of Porocephalosis.—*West African Med. J.* 1937 June. Vol. 9 No 2 p 41

Porocephalosis is a rare condition and according to a well-known text book the diagnosis is never made during life. MANUWA recorded a case in which the parasites were found at autopsy on a man who had died with acute abdominal symptoms [see this *Bulletin* 1936 Vol. 33 p 475]. Dr Ellis here records the case of a native aged 28 years operated upon for left inguinal hernia, in the sac of which a Porocephalus was found [Dr Ellis erroneously ascribes the review in the *Bulletin* above mentioned to STAMMUS both in the letterpress and in the reference.]

H H S

LEYVA (Jose F) & GUTIERREZ (Eusebio) Toxicological Studies of Nani, *Dioscorea hispida* Dennst.—*J. Philippine Islands Med. Assoc.* 1937 June Vol. 17 No. 6. pp 349-356 With 2 figs. [Summary appears also in *Bulletin of Hygiene*]

*Dioscorea hispida* is a plant whose tuber is used for food in the Tagalog provinces and other parts of the Philippines under the name *nani*. It has frequently caused accidental food poisoning and has been used with criminal intent (compare *Eugenia sapida* the Akoe, in Jamaica). The poison ordinarily is removed or removal is attempted,



Tubers of *Dioscorea hispida* Dennst., used as food in many parts of the Philippines

[Reproduced from the *Journal of the Philippine Islands Medical Association*]

by a crude method. [The method is not mentioned in this article, but on the analogy of bitter cassava *Manihot ulitissima* may be by repeated washing]

For their experiments the authors used mature full grown tubers which have a hairy back and beneath this a yellow cortical layer and an inner yellow fleshy medullary part. Hydrocyanic acid or a cyanogenetic glucoside was looked for but neither was found. By process for extraction of alkaloids one of these was obtained and found to be soluble readily in water alcohol and chloroform, not soluble or only sparingly in ether. It gave reactions like those of dioscorine described by GORTER and by SCHUTTE as extracted from a Java variety 40 years ago. The alkaloid was present, more or less uniformly distributed in both cortical and medullary parts. Its toxicity was tested on mosquito fish on mice and on a monkey and by analogy the fatal dose for a man of 50 kgm. would be 2.5-3 gm. H H S

WEDD (G D) The Manchineel Tree—*Jl Roy Nav Med Serv* 1937 July Vol. 23 No 3 pp 250-254 With 2 figs.

The author gives a brief account of the irritant and vesicant properties of the juice of the Manchineel tree, *Hippomane mancinella* which from cases coming under his own observation he thinks have been grossly exaggerated an opinion supported by experiments in which local application of the juice was followed by erythema in an hour and small vesicles the following day disappearing in three days. [The author states that he can find no reference to the subject in the current medical text-books. Presumably BYAM and ARCHIBALD's

*Practice of Medicine in the Tropics* is no longer regarded as a current text book, for an account is given of the poisonous effects of the fruit when eaten and incidentally its use as an arrow poison is mentioned (Vol. 1 pp 778-8 & p 773) and the tree and fruit are illustrated reference to this *Bulletin* as recently as September 1936 Vol. 33 p. 723 would have provided further information.]

H H S

WEISE (W) Vergleichende Untersuchungen zur Methodik der Hämoglobinbestimmung im Blute [Comparative Investigations of Haemoglobin Estimation in Blood.]—*Biochem Ztschr* 1937 Sept 24 Vol. 293 No 1-2. pp. 64-83 With 2 figs [26 refs.]

By the use in combination of a colorimeter of the Duboscq type with a monochromator and a rotating sector for the adjustment of light intensity an apparatus was constructed which gave very exact readings without a comparison solution. Spectrocolorimetric estimation of haemoglobin as reduced haemoglobin is also a reliable process, which shows good agreement with the results of gas analysis. For control of the spectrophotometric measurement of oxyhaemoglobin it is preferable to employ Hufner's quotient. These quotients varied with one exception within the narrow limits of 1.64 and 1.67. The average of all the observations was 1.649. The details of these methods and of the working of the instrument used must be consulted in the original. Of more interest to the clinician are the comparisons made of physicochemical laboratory methods with those which are used in medical practice. The first of these relates to the measurements of haemoglobin content after transformation into haematin. Here a warning is given of the error which may appear in estimations due to the presence in the blood under modern conditions of civilization of such derivatives of haemoglobin as carboxyhaemoglobin, methaemoglobin and sulphaemoglobin. In the process of transformation of blood pigment into haematin all those derivatives of haemoglobin which might exercise an effect on the result furnish exactly the same product. It was desirable therefore to determine exactly what result the "total haemoglobin" gave by its transformation. The ordinary clinical hydrochloric haematin method could not be used for this purpose because here the haematin is present in very labile colloid form. The method which proved especially useful was the estimation of haematin in alkaline solution. The haemoglobin (0.2 cc. blood) was first transformed into acid haematin with hydrochloric acid acting for 10 minutes at 40°C. or 40 minutes at room temperature. To this was added 2.5 cc. N/10 sod. hydroxide and, after cooling, 20 cc. water. The haematin determination was made in the spectrocolorimeter. It was found that by this method exact estimations of total haemoglobin could be obtained but that, even in an alkaline solution, allowance has to be made for the effect on colorimetric determinations of the colloids (serum) present. Another method considered is that of the iron content of the blood. General unanimity exists on the subject of the iron content of serum or plasma. It stands normally at 0.1 mgm. per cent. This is equivalent, for whole blood to 0.05 mgm. per cent a value which is practically negligible.

by comparison with the 40 to 60 per cent of haemoglobin iron. Thus the iron content of haemoglobin in normal blood may be exactly computed. The author has worked out a satisfactory iodometric method applicable to small quantities of blood —

(1) Mix together 1 cc. 20 per cent sulphuric acid (about 5N) and 2 cc. whole blood rendered incoagulable with oxalate or heparin. (2) Place at 115 C. to desiccate for 3 hours. (3) Convert to ash in an electric furnace. (4) Convert the oxide of iron of the ash to sulphate by addition of 5cc. 20 per cent sulphuric acid and wash over into a flask. (5) Evaporate off the water but not too completely lest the ferric sulphate be rendered anhydrous and difficult of solution. (6) Dilute the sulphate solution with water completing the volume to 50 cc. and add 1 cc. 1 per cent starch solution. (7) Pass carbon dioxide through the solution for 10 minutes. (8) Add 2 gm. pure pot. iodide and leave 20 minutes. (9) Titrate with N/100 thiosulphate (1 cc. N/100 thiosulphate = 0.5384 mgm iron) and N/100 pot. iodide. (10) Control the reliability of the method by analysis of a standard ferric sulphate solution of 1 mgm iron per cc.

As this method required a minimum of 2 cc. blood test was made of Wong's colorimetric process for smaller quantities. This proved satisfactory and is recommended for the standardization of clinical haemoglobinometers. Very concordant results for blood iron were obtained with these two methods — 57.5 mgm per cent. iodometric and 57.6 mgm per cent colorimetric.

Finally, comparative determinations were made on whole blood with 25 normal samples of the methods — Oxygen absorption iron reduced haemoglobin spectrophotometric (Hüfner's quotient and Hb) haematin. All the five methods could not be carried out in every case with the blood available. They all gave good agreement.

W. F. Harvey

CORDERO (Narciso). *Present Status of Hemoglobin Estimations.*—*Philippine Islands Med Assoc* 1937 May, Vol. 17 No 5 pp 263-269 [15 refs.]

In this valuable paper the author critically reviews the limitations and shortcomings of the different methods of estimating haemoglobin.

Three fundamental determinations have formed the basis of most clinical haematological methods employed in estimating haemoglobin in blood. The first is Hüfner's value of the oxygen combining capacity of purified haemoglobin, 1 gramme being estimated to combine with 1.34 cc. of oxygen at 0°C and 760 mm Hg. The second is Haldane's figures for the oxygen combining capacity of whole blood, 100 cc. of which were estimated to combine with 18.5 cc. of oxygen under standard conditions. The third consists of determinations of the oxygen binding power of whole blood with the van Slyke blood gas apparatus. For normal Americans the average figure was 20.9 volumes per cent.

In certain clinical methods such as that of Talquist and Dare, unchanged blood is used while in others such as Sahli's and Newcomer's the blood is changed into acid hematin before comparison with the standard. Though in recording results it is still common to use the percentage method there is a tendency to express haemoglobin values in grammes of haemoglobin per 100 cc. of blood and for this

purpose Hüfner's figure for the oxygen binding capacity of 1 gramme of haemoglobin is universally used. Haemoglobinometers are numerous and have different standards as follows —

Sahli	17.3 gm. per 100 cc. blood.
Dare	16.9 "
Newcomer	16.9 "
Fleischl Miescher	15.8 "
Oliver	15.0 " " "
Haldane	13.8 " " "
Talquist	13.8 " " "

The advantage of expressing results in grams is that regardless of what is normal, the value represents a definite quantity which will be the same whatever apparatus is used. The actual determination of the normal has to be established for each locality or group of people.

The blood of a normal Englishman should not be radically different from that of an American unless it be due to differences in the methods employed and under these circumstances it is not surprising to find that the Haldane blood gas apparatus gives lower results than the van Slyke with the same samples of blood or haemoglobin solution. Furthermore Hüfner's figure that 1 gm. of haemoglobin combines with 1.34 cc. of  $O_2$  assumes that the haemoglobin is 100 per cent. pure but actually this cannot be the case since during its preparation a small amount of inert methaemoglobin must be formed. The purest preparations of recrystallized haemoglobin are now estimated to contain 5 to 10 per cent. of methaemoglobin. Van Slyke estimates on theoretic grounds that 1 gm. of haemoglobin should combine with 1.36 cc. of  $O_2$ .

Wong and others have recently estimated haemoglobin by determining its iron content after desiccation. All organic matter in haemoglobin or blood is first destroyed by strong acids and the Fe subsequently determined by the thiocyanate or another method. The number of mgm. of Fe divided by 3.35 gives the mgm. of  $HbO_2$  in 100 cc. of blood. Just how this method checks up with the  $O_2$  capacity method has not yet been determined.

The average haemoglobin in Filipino blood is estimated as from 12.4-14 gm. per 100 cc of blood. Finally the author enjoins clinicians to express haemoglobin values in grammes per 100 cc. of blood and stresses the necessity for checking standards from time to time by the  $O_2$  binding capacity method or the iron method.

*N Hamilton Fairley*

HARVEY (W F) Studies in Method and Standardisation of Blood Examination. V The Blood Platelet Count.—*Edinburgh Med J* 1937 Apr Vol. 44 No. 4 pp. 231-234

The author described a method for estimating the number of blood platelets which involves their direct count in a red cell haemocytometer chamber. Finger blood is diluted 1-100 in a red cell pipette with an 0.35 per cent. salt solution which haemolyses most red cells but apparently does not destroy the platelet elements. The pipette is left for one hour at room temperature and four mixings are made during

this interval. As the blood platelets do not sink as readily as erythrocytes it is necessary to focus up and down over each unit square in order to ensure that all are counted. Figures obtained from daily counts of the blood platelets on a single individual were analysed and ranged from 150 000 to 210 000 per cmm. These values as the author suggests are definitely lower than those obtained by other observers and may be due to some having been lost by adhesion to the diluting pipette. The blood platelet count is given in the shape of a frequency distribution as a reasonable normal for this particular method of estimation with range mean and standard deviation. No claim is made that this represents absolute figures but the author suggests that subnormal normal and supernormal conditions of the thrombocytes can be estimated by comparison with this standard.

\ Hamilton Fairley

DHAR (Jyoti) Normal Hematological Standards in Indian Women.—  
*Folia Haematologica* 1937 Vol. 57 No 1 pp 78-86  
 [16 refs]

A most useful study the results being based on investigations of the blood of 86 women apparently in normal good health. 77 were healthy college students 5 probationer nurses and 4 others relatives of patients in hospital. All were born of Bengali parents and were brought up in Bengal. 34 were between 16 and 18 years of age 29 between 18 and 21 14 between 21 and 25 and 9 over this age. The author himself made all the investigations thus reducing at least unifying any personal error. He studied the red and white cell totals haemoglobin value mean corpuscular haemoglobin diameters of red cells differential leucocyte count and reticulocytes in fact the only point of importance omitted was the Arneth count.

The figures are worth placing on record and the author's table is therefore reproduced —

*Normal Hematological Standards in Indian Women*

	Average Values
Red cells (millions per c.mm.)	3.73
Hemoglobin (grams per 100 cc.)	11.47
Hemoglobin (Sahli value)	66.63
Pigment-cell ratio (milligrams per 100 millions of red cells)	3.07
Mean corpuscular hemoglobin (micro-micrograms)	30.75
Hemoglobin coefficient	15.60
Color Index	0.99
Mean diameter of red cells (microns)	7.00
Reticulocytes (percentage)	0.94
Leucocytes (thousands per c.mm.)	5.61
Basophils (percentage)	0.13
Eosinophils (percentage)	3.24
Neutrophils (percentage)	64.84
Myelocytes (percentage)	0.01
Juveniles (percentage)	1.33
Stab forms (percentage)	9.83
Segment nucleus (percentage)	53.53
Lymphocytes (percentage)	30.29
Monocytes (percentage)	1.50

H H S



NAFIER (L. Everard) & DAS GUPTA (C. R.) Haematological Studies in Indians. Part VII. The Incidence and Degree of Anaemia amongst Pregnant Females of the Coolie Population.—*Indian J Med Res* 1937 Apr Vol. 24 No. 4 pp 1159-1163. With 1 chart

In this paper the authors report on the haemoglobin values observed in 228 pregnant women in 19 different tea gardens in Assam. Estimations were made with the Hellige apparatus. The mean haemoglobin of the whole series was 9.22 grammes which was distinctly lower than the figure of 10.03 grammes calculated as the normal for coolie women. The low figure of 8.875 grammes (50 per cent haemoglobin) was arbitrarily taken as the lowest level for normality. On this basis 192 were regarded as falling within normal limits and 36 as definitely anaemic. The mean and standard deviation of this so-called 'normal' group was  $9.99 \pm 1.72$  grammes which closely approximated to the figures obtained for non-pregnant coolie women i.e.  $10.03 \pm 1.70$ . From the evidence available they conclude that whilst pregnancy tends to increase very slightly the incidence of anaemia, it does not lower the haemoglobin level of the female population to any appreciable extent.

There was no correlation between the incidence of anaemia and the duration of pregnancy but definite anaemia was most common in the youngest age groups. Statistically the percentage incidence of anaemia was significantly greater in the first pregnancy than in pregnancies subsequent to the fourth but the difference between the first pregnancy and the second, third or fourth respectively although considerable was not significant.

In summarizing the authors record their opinion that though the haemoglobin state of the general female population was far below that of other female populations there was little evidence of any general physiological lowering of the haemoglobin level in pregnancy such as has been observed in other countries. The incidence of definite anaemia during pregnancy was slightly higher than in the general female coolie population especially amongst the younger women and during the first pregnancy.

N Hamilton Fairley

NAVARRO (Regino J.) Hematology in Filipinos. I. Normal Blood Iron Content. Hemoglobin Determination through Iron.—*J Philippine Islands Med Assoc* 1937 June. Vol. 17 No. 6. pp. 331-338 [13 refs]

The author in this investigation had three ends in view (1) Determination of the normal Fe content of the blood in Filipinos (2) Obtaining an accurate and practical method of estimating the haemoglobin (3) Replacement by a simpler method than van Slyke's of a means of standardizing clinical haemoglobinometers. His subjects included students, nurses, hospital attendants considered to be in good health—101 males and 34 females. Ten cc. of blood were taken into a test-tube containing two drops of 30 per cent. potassium oxalate and one cc was used for the test. The Fe was determined at first by Dupray's modification of the Wong method later by Wong's later modification.

The haemoglobin content was calculated by dividing the Fe content by 3.35. The Hb content was found to be 14.1 gm per 100 cc. in

males 12.6 gm. in females that is less than American normal standards but higher than previous Filipino records. The author suggests that to maintain accurate clinical records the haemoglobinometers in use should be checked at frequent intervals with iron values. Individual detailed findings are presented in tables. *H H S*

STZUKI (Tamotsu) How to Judge Blood Picture Part I A Study on the Relation between Prognosis and Neutrophile Blood Picture (In Cases of the Infantile Diarrhoea) 7th Hematological Paper Part 2. A New Standard Table of Normal Blood Picture for Every Age and a New Resistance Triangle of Leucocytes. 8th Hematological Paper—*Tohoku Jl Experim Med* 1937 Mar 15 Vol 30 No 5 pp 368-377 With 1 coloured fig [13 refs] pp 378-388 With 4 figs [49 refs]

The authors in this paper have studied the relationship between the prognosis in cases of infantile diarrhoea and the neutrophile blood picture with special reference to the nuclear shift and whether it is regenerative or degenerative in character. Blood examinations were made on admission and 38 patients were investigated from this viewpoint. The blood of seven out of nine patients who recovered showed a left shift of a regenerative nature while in sixteen out of eighteen fatal cases the nuclear shift to the left was degenerative in type. A close relationship existed between acidosis and nuclear shift. Thus all the twenty patients who presented marked acidotic features also showed a marked left shift of the neutrophils. Excessively abnormal responses whether of the nature of a very high neutrophilia or as marked neutropenia indicated a bad prognosis. Similarly a disturbance of parallelism between the nuclear shift and the neutrophil count was ominous.

A severe shift did not necessarily imply a graver prognosis than a slight shift. Qualitative as well as quantitative observations have to be made and it is essential to differentiate whether the cells are of regenerative or degenerative type. Where the degree of left shift is high a shift of a regenerative nature will generally carry with it a rather better prognosis.

It is pointed out that in the domain of pediatrics the interpretation of the blood picture is complicated by the considerable amount of physiological variation which occurs at different ages. With the object of getting over this difficulty the author has published a new standard table of normal blood pictures for every age and a new resistance triangle of leucocytes. The latter supplies information for judging prognosis in any given case.

Those interested are advised to consult the original paper

*N Hamilton Fairley*

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safe for both Europeans and Natives. Intended originally in the days of the East India Company to protect European settlers against ravages of deadly epidemics and based purely on commercial principles it developed gradually into a highly organized public health service with a high standard of social morale which has brought great blessings to the masses of the native population.

It is interesting to note that the author ascribes the change from the commercial mentality of the East India Company to the ideological social work which inspires the present-day medical service of the Dutch East Indies to the influence of Thomas Stamford Raffles who was Lieutenant-Governor of Java from 1811 till 1816.

This book is certainly worth reading and it should be of particular interest to students of history of medicine as it gives a most vivid and well documented picture of the struggle against disease in the Dutch East Indies during the last three centuries.

*H. Lomas.*

# TROPICAL DISEASES BULLETIN

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[No. 2.

## TROPICAL DERMATOLOGY

### A REVIEW OF RECENT ARTICLES IV \*

*Chromoblastomycosis*—From Japan there comes a long account of a single case published by TAKAHASHI<sup>1</sup>. A seventy-seven year old farmer living near Tokio struck the back of his right wrist against a piece of wood. The slight abrasion healed within ten days but after another ten days a small red nodule appeared on the site. This gradually enlarged and broke down some four weeks later. The patient was seen about twelve months after the original accident and he then presented an ulcer measuring 8 cm. by 4½ cm. over the back of the hand and forearm but with the long axis lying transversely. The surrounding skin was bright red whilst the edge of the ulcer was blue raised in some places undermined and in others infiltrated. The base was studded with small papillomata yellowish red in colour and none of them larger than the size of a pin's head. A greyish white exudate could be expressed from between these excrescences. Some hyperkeratosis was present over the radial edge of the ulcer which on the whole had the consistency of a tuberculous lesion. No enlargement of the glands could be detected nor were there any signs of systemic involvement. From this patch there was isolated a fungus of which full histological and cultural details are given. To this it is proposed to give the name *Hormodendron japonicum* n. sp. The organism was experimentally injected into the patient and into a volunteer in both cases specific lesions resulted. The fungus was also proved to be strongly pathogenic to mice and white rats but guinea-pigs and dogs were not susceptible to infection.

*Acladiosis*—BUTLER<sup>2</sup> has made a very careful study of all available records and descriptions of *Acladium castellanii*. He also gives a very full account of its morphology when studied in different organic media. The resulting conclusion is that this fungus is really very closely

\* For the third of this Series see Vol. 34 pp. 175-182.

<sup>1</sup> TAKAHASHI (Yoshitada) Zur Chromoblastomykose (II Mitteilung) Ueber Chromoblastomykose hervorgerufen durch *Hormodendron japonicum* n. sp.—*Japanese Jl Dermat & Urol* 1937 Feb 20 Vol. 41 No. 2 pp. 53-62. With 7 figs.

<sup>2</sup> BUTLER (E. J.) *Acladium castellanii* Pinoy and the Existence of the So-called Acladiosis of Castellani.—*Parasitology* 1937 Apr Vol. 29 No. 2. pp. 259-265 With 9 figs. & 1 coloured plate. (13 refs.)

related to and perhaps merely a strain of the widely distributed *Sporotrichum schenckii* the commonest cause of human and equine sporotrichosis, and that the term acidiolosis as denominating a distinct disease should be deleted.

*Nocardia*—An English summary accompanies a paper in Italian by CARPANO<sup>3</sup>. This contains very few clinical details being mainly of pathological interest. In Egypt there exist certain chronic nodular and pustular lesions of the face which are resistant to treatment, which give rise to frequent relapses and which leave scars similar to those seen after smallpox. The organism found in the pus is anaerobic and extremely difficult to cultivate. It is also polymorphic and animal experiments have proved unsatisfactory in that no particular type of lesion appears to be caused by inoculation. Nevertheless the fungus is considered to belong to the *Cohnistrepthothrix* and the author proposes a new species, *C. missri*.

*Piedra*—A simplification of the classification of these fungi is proposed by SIMONS<sup>4</sup> who considers that the terms black and white *piedra* are sufficient. The black form is essentially tropical in distribution whilst the white form is also found in Europe. Both varieties have been cultivated from the same hairs but it was found that only the black form could be grown after the hairs had been washed in 70 per cent. alcohol and then kept for some months. It is further suggested that the white is only a secondary invader and is therefore a *Piedraia*. All the author's histological preparations of the black organism were characteristic of the Hortal fungus. In the case of one white specimen however he found that hanging drop cultures showed blastospores, chlamydospores or mycelium, thus differing from other white varieties which have been described. It is suggested that this particular white form really belongs to the *Geotrichoides*. A clinical account of the condition as seen in chimpanzees is published by LOCHT<sup>5</sup> who found five cases in the Munich zoo. Attention was first drawn to one particular animal in which the white hairs on the genital area were seen to bear brownish black colonies of the fungus. The microscopical picture was typical. Subsequently five out of seven chimpanzees examined were found to be infected. They had all been obtained from the Cameroons and in all of them the disease differed from that seen in human beings in that the affected hairs became fragmented. Specimens of hair obtained from chimpanzees in the zoos at Copenhagen, Hamburg and Göttingen were found to be free from infection.

*Trichosporosis*—NIVEN<sup>6</sup> describes a case seen in a male European aged 35 years, in whom black nodules were found on hairs situated on the top and on the right side of the head. This is apparently the

<sup>3</sup> CARPANO (Matteo). Su di una *Nocardia* osservata in una dermatosi nodulo-pustolosa dell'uomo in Egitto (*Cohnistrepthothrix missri* n. sp.)—*Riv. di Pat. Sif.* Roma 1937 Apr. Vol. 1 No. 2 pp. 107-131 With 20 figs on 5 plates [10 refs.] English summary

<sup>4</sup> SIMONS (R. D. G. Ph.). *Piedra alba* en *piedra negra*—*Groenish Tijdschr. Nederl. Ind.* 1936 Nov. 17 Vol. 78 No. 46 pp. 2976-2986 With 10 figs on 2 plates [29 refs.] English summary

<sup>5</sup> LOCHT (Th.). Ueber das Vorkommen der *Piedra* beim Schimpansen und ueber die Beziehungen der tierischen *Piedra* zur menschlichen—*Arch. f. Dermat. u. Syph.* 1937 Jan. 2 Vol. 173 No. 1 pp. 107-113 With 7 figs

<sup>6</sup> NIVEN (J. C.). A Case of *Trichosporosis* in Malaya—*Malayan Med. J.* 1936 Dec. Vol. 11 No. 4 p. 223.

first case to be described in Malaya. The fungus was found to resemble *T. giganteum* very closely but its spores were somewhat smaller being only  $4\frac{1}{2}\mu$  to  $9\frac{3}{4}\mu$  in diameter.

**Pinta**—It has been claimed that in Yucatan there exists a special type of pinta which is characterized solely by complete depigmentation. Howard Fox<sup>7</sup> has investigated this statement and in his opinion it is entirely without foundation. The disease so described appears to be ordinary vitiligo and it is even unconnected with syphilis for only 1 out of 25 cases gave a positive Wassermann reaction in the blood. In pinta of course the number of positive Wassermann reactions is as high as it is in secondary syphilis or secondary yaws i.e. it occurs in practically all cases. Nor had any of the suspected patients ever exhibited any of the various shades of blue so characteristic of pinta. No story suggestive of earlier pigmentation of any kind was ever obtained. The author makes no mention of fungi as he does not believe that they play any part whatever in the causation of this disease.

**Tinea tonsurans**—The amount of work that has been done on this disease in North Africa during the past decade is astonishing. CATANEI<sup>8</sup> now reviews the whole period so far as the town of Algiers is concerned. Of 184 infected children only 18 were of European stock. These showed the presence of *T. glabrum*, *T. violaceum*, *T. acuminatum* and *T. umbilicatum* in that order of frequency. The remaining 166 natives showed the great preponderance of *T. glabrum*, 125 being infected therewith. *T. violaceum* provided a poor second, 25 cases being found. Only one example of infection with *T. sumatum* had been seen. There were only 11 cases of *Microsporon* invasion of the scalp of whom 4 were Europeans, 2 were Jews and the rest were natives. All eleven showed *M. felineum* on culture. Favus of the scalp was seen 79 times but only 3 cases occurred in Europeans. Cultures of 4 *schönleini* were grown from 66 of the children. So far as the glabrous skin was concerned it is interesting to note that *T. radiolatum* was only isolated on two occasions. In brief the flora in the town was similar to that found in the surrounding country. As always more varieties were found among Europeans than among natives. The same author in collaboration with FOLEY and PARROT<sup>9</sup> describes the first case seen in an adult native of cutaneous ringworm due to *T. violaceum*. It occurred on the left wrist of a man aged thirty living in the Southern Oran. The scalp infections in the children of this area are nearly all due to this organism. LANGERON<sup>10</sup> has published a further paper concerning the material obtained from 3 000 infected children in French Western Morocco (see *C. R. Acad. Sci.* 1937 Vol. 204 p 372). The distribution of ringworm is patchy but of course it does occur particularly in towns. *T. violaceum* is dominant and *T. glabrum* is rare. Some 20 per cent. are due to *T. endothrix*. Altitude

<sup>7</sup> FOX (Howard). White Pinta, or Vitiligo, in Yucatan.—*Arch. Dermat. & Syph.* 1937 Sept. Vol. 36 No 3 pp 534-535.

<sup>8</sup> CATANEI (A.). Les teignes à Alger.—*Bull. Soc. Path. Exot.* 1936 Dec. 9 Vol. 29 No 10 pp 1038-1042.

<sup>9</sup> FOLEY (H.) PARROT (L.) & CATANEI (A.). Sur un cas de teigne cutanée à *Trichophyton violaceum* chez un indigène adulte en Algérie.—*Arch. Inst. Pasteur d'Algérie* 1936 Dec. Vol. 14 No. 4 pp 424-425.

<sup>10</sup> LANGERON (Maurice). Nouvelles observations statistiques et mycologiques sur les teignes humaines au Maroc.—*C. R. Acad. Sci.* 1937 Aug. 23 Vol. 205 No 8 pp 422-424.

does not apparently affect the incidence and Jews do not seem to be more prone to the disease than are other races. Favus due to *A. schönleinii* is rare. The type *milochetii* is dominant on the coast and in Marrakesh whilst the types *debueni* and *brumpti* are most common among the nomadic peoples of the Atlas areas. The type *pittalugae* has been seen in Fez in which town there has also been found the type *taliceii* both however being extremely rare. It is interesting to note that types *debueni* and *brumpti* have not been found below the 1,500 feet level whilst the type *milochetii* occurs only below that elevation and has never been seen above it.

**Other Fungus Infections**—SARTORY<sup>11</sup> makes reference to a tropical dermatosis caused by a yeast-like organism. This paper is restricted to notes on the investigations into the identification of the parasite all clinical details being reserved for a later communication. It is proposed to christen the fungus *Geotrichodes lambarensis* n. sp. Very full details are given and among them the following points are of importance. There is a ramifying mycelium having a diameter less than 1 $\mu$  which is extremely fragile and sometimes spiral. Reproduction occurs by means of apical or lateral blastospores and chromophil arthrospores. On solid media there are formed white viscous colonies which later become more membranous and turn a mahogany brown colour. The organism produces liquefaction in gelatin casein and serum-albumen whilst hydrolysis of the mono- and di-saccharides occurs without production of gas except in the cases of lactose and saccharose. Maize mildew has hitherto not been thought to be pathogenic to man but PREINTINGER<sup>12</sup> has now published a case in which this fungus a basidio-mycete *Ustilago maydis* has definitely invaded human skin. The patient was a male agricultural labourer aged 31 living in Central Europe. The lesions started with burning redness swelling and dryness of the feet and hands. Within three days the same changes made their appearance in the flexures of the knees elbows and axillae. At the time of examination some three weeks after onset practically the whole of the head body and limbs was affected. The skin generally was seen to be red with a brownish tinge and flaking. On the chest and buttocks there were scattered red hard pin-head sized papules. The fungus was easily found on microscopy of scales, all other pathological investigations proving negative. The diagnosis was confirmed by the history and by finding the same organism in specimens of maize obtained from the field in which the man had been working. The author then recalls to mind an exactly similar case seen some two years earlier. Contributory factors are probably to be found in excessive sweating under heavy clothing during a warm wet autumn.

**Cultures of Fungi**—A rapid cultural method for the diagnosis of tinea infections is described by BLUMENTHAL and SNOW<sup>13</sup>. Careful

<sup>11</sup> SARTORY (A.), SARTORY (R.), MEYER (J.) & WALTER. Une dermatomycose tropicale causée par un champignon levuriforme *Geotrichodes lambarensis*.—*Ann. Inst. Pasteur* 1936, Nov. Vol. 57 No. 5 pp. 526-544. With 8 figs.

<sup>12</sup> PREINTINGER (THOMAS). Durch Maisbrand (*Ustilago maydis*) bedingte Dermatomykose.—*Arch. f. Dermat. u. Syph.* 1937 Oct. 19 Vol. 176 No. 2 pp. 109-113. With 3 figs.

<sup>13</sup> BLUMENTHAL (FRED L.) & SNOW (JAMES S.). A Rapid Cultural Method for the Diagnosis of Tinea Infections.—*J. Amer. Med. Assoc.* 1936, Oct. 24 Vol. 107 No. 17 pp. 1367-1369. With 4 figs.

attempts have been made to ensure the validity of the experiments by using 48 different cases of ringworm 42 controls direct microscopy and the usual methods of culture. A hanging drop preparation is made in a liquid medium consisting of crude maltose of Charnet 4 gm. peptone of Chassaing 1 gm. with distilled water made up to 100 cm. A small amount of carefully selected material is placed in the centre of the slide the coverslip then being sealed with melted paraffin applied to the edges with a knife. Incubation is carried out at room temperature and the preparation is examined twice daily. Positive growth has been found to occur within one to eight days in 72 per cent. of the cases. The illustrations are very striking.

*Pityriasis Rosca* — MAPLESTONE and DEY<sup>14</sup> briefly consider the hypotheses which have been advanced as to the causation of this disease. In an effort to elucidate the problem they treated cases by injection with a filtered carbolized emulsion of material taken from the skin lesions which presumably contain the killed virus. Their results are not absolutely conclusive but they do lend very strong support to the work of Thomson and Cumings who were the first to produce reasonable evidence that a virus is the causative factor. It is also important to note that the authors looked for fungi without avail and that in India! A new lesion of about 1 cm. diameter was cleaned with a mixture of equal parts of alcohol and ether. It was then anaesthetized by the injection of 2 per cent. novocaine beneath it and dissected out care being taken to include no normal skin in the specimen. This excised material was then thoroughly washed with water and ground up in an agate mortar with sterile pumice powder. Normal saline was gradually added to mix 1 cc. with each 10 mgm. of tissue. When homogeneous this was filtered through a Chamberland L3 candle into a vaccine bottle and to the filtrate was added an equal quantity of either 1 per cent. phenol or 0.2 per cent. formalin. The preparation was ready for use after testing for sterility. This solution was injected in 28 cases starting with 0.1 cc. and increasing by 0.1 cc. daily 0.5 cc. being the maximum adult dose. The method did apparently shorten the course of the disease and it is certain that some more chronic cases did clear rapidly after the commencement of treatment. Careful study of the cases in detail certainly makes their results more striking.

*Diseases of the Skin in Negroes* — A general study is presented by LOEWENTHAL<sup>15</sup> who first describes the anatomy of the skin. There are more apocrine sweat-glands more sebaceous glands and a greater number of skin capillaries than occur in the white races. The distribution of pigment in the epidermis mucous membranes body areas etc. is fully described and it is suggested that the lighter skinned races have chosen their environment. This is of course in opposition to the more general view that the environment has changed the racial characteristics. Racial factors play their part in the aetiology of dermatoses thus fibrosis keloid formation and lichenoid papules are all more common in the black races. Other skin lesions seem to be

<sup>14</sup> MAPLESTONE (P. A.) & DEY (N. C.). The Treatment of Pityriasis Rosca.—*Indian Med Gaz* 1937 Mar Vol 72. No 3 pp 135-139.

<sup>15</sup> LOEWENTHAL (L. J. A.). Diseases of the Skin in Negroes.—*J Trop Med & Hyg* 1936 Sept. 15 Nov. 2, 16 Dec. 1 & 15 Vol 29 Nos. 18, 21, 22, 23 & 24 pp 209-212 250-251 260-264 276-278 295-297 & 1937 Jan. 1 Vol. 40 No. 1 pp 4-8 With 5 figs. [132 refs.]



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Hyg 1836 Sept. 15 Nov 2, 16 Dec 1 & 15 Vol 29 Nos 18, 21  
& 1937 Jan. 1 pp 209-212 250-251 260-261 276-278 285-297  
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specially modified thus the annular papular syphilide is almost a racial peculiarity whilst gummata in the centre of the forehead are a common result of trauma in Moslems. Some diseases are relatively rare, *e.g.* psoriasis rosacea, eczema dermatitis due to external irritants, alopecia senilis and alopecia areata is said to be actually unknown. Many other problems are mentioned, such as the relative lack of itching the probable relative immunity from cutaneous forms of cancer etc. A paper which is both interesting and stimulating

*Sydney Thomson*

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## MALARIA

MARTINI (E.) Die didaktische Bedeutung der Malaria [Didactic Importance of Malaria.]—*Arch f Schiffs u Trop Hyg* 1937 Jan Vol 41 No 1 pp 158-162

The author notes that in the Hygiene Museum in Dresden the space devoted to malaria is a single small showcase. Though this may be justified by the fact that the disease is of little practical importance in Germany nevertheless it should be realized that from the instructional point of view there is no disease so suitable for teaching the student of malaria has many aspects and embraces knowledge of the vertebrate and invertebrate hosts the parasites causing the disease the methods of infection and the various factors influencing the transmission of the disease. All these have been so thoroughly worked out that there can be no better educational exercise for the student than the study of malaria from every point of view. C 11 Henyon

SWEET (W C.) A Study of Village Malaria in Mysore State.—*Records of the Malaria Survey of India* 1937 June-Sept Vol 7 Nos. 2 & 3 pp 191-207 With 1 map & 2 graphs

This is a study of malaria in three villages close to the junction of the Cauvery and Kabbani Rivers in Mysore. In spite of their proximity the malaria conditions in these three villages are very different. Gargeshwari had a spleen index of 21 (children from 0 to 14 years of age) and a corresponding parasite index of 6.9. During the previous year 1934 there had been a mild epidemic but it is probable that this village is never entirely free from malaria. Yedadore has a high degree of endemic malaria parasite index 41.7 spleen index 73.7. Byrapura is generally nearly free from malaria in 1935 however when the study was made there was a mild epidemic. Infection probably originated from a camp of bridge labourers close at hand. The parasite index was 16.4 and the spleen index 15.0. *A. culicifacies* is much the most prevalent Anopheline. Its prevalence was approximately equal in Gargeshwari and Yedadore but considerably lower in Byrapura. Catches in human dwellings in buildings housing both human beings and cattle and in cattle sheds of infected and non-infected *A. culicifacies* suggest that this species is not strongly attracted to human beings as a source of blood. Houses harbouring both man and cattle appear to offer special facilities for malaria transmission. The relative scarcity of such buildings in Gargeshwari possibly explains why that village suffers much less from malaria than does Yedadore. The comparatively low density of *A. culicifacies* in Byrapura probably explains its normally low malaria incidence.

Norman White

EGYPT MINISTRY OF PUBLIC HEALTH ANNUAL REPORT ON THE WORK OF THE DEPARTMENT OF PUBLIC HEALTH FOR 1935 [Malaria pp 47-56]

The number of cases of malaria notified to the Ministry of Public Health of Egypt has increased each year since the disease was made notifiable in 1930. How far this represents a real increase in the

incidence of the disease it is impossible to say. During the last two years however the Nile floods have been abnormal and it is probable that this has produced increased malaria prevalence. In 1935 there were 7,560 cases reported with 62 deaths as compared with 3,057 cases and 31 deaths in the previous year. The report gives information regarding the distribution of these cases and details of the anti-larval and other measures taken in an attempt to control the disease.

N IV

PERYASSÚ (Antonio) O impaludismo no Pará. [Malaria in Pará, Brazil].—*Brasil Medico* 1937 Sept. 25 Vol. 51 No. 39 pp. 695-697

This paper contains information about the prevalence of malaria in the State of Pará and the measures designed to diminish the prevalence. The disease is widespread throughout the territory. *Pl. vivax* infections are four times as numerous as are *falciparum*. Quartan infections are commonly met with in rural areas rarely in towns. The two Anophelines that are responsible for nearly all the malaria in Pará as in most other parts of Brazil are *albistarsis* and *larsimaculatus*. The density of these two species in certain parts of the interior is described as fantastic. For the purpose of malaria control the State is divided into ten districts each in the charge of a special medical officer with subordinate staff. Each municipality has its own medical officer or pharmacist with hospital accommodation of from 10 to 15 beds for the treatment of grave cases, and a laboratory. Travelling dispensaries provide for the distribution of anti-malaria drugs in outlying districts. Special measures are enforced for the destruction of mosquitoes and larvae on steamboats on the Amazon.

N IV

SCHARFF (J. W.) Hydro-Technical Methods in the Prevention of Malaria.—*Jl Roy San Inst* 1937 Nov Vol. 58 No. 5 pp. 345-350 With 4 figs.

This paper was read before the Tropical Hygiene Section of the Health Congress of the Royal Sanitary Institute. The different methods of hydro-technical control are enumerated and a short description is given of two such methods that have demonstrated their utility in Malaya viz. sluicing or flushing, and agitation of the water surface. The author has previously published full descriptions of this work, which have been noted in this *Bulletin* [1936 Vol. 33 p. 770].

N W

HARNES (J. W. P.) & SAMARA (M. Y.) The Use of Dynamite in Anti-Malarial Drainage and Reclamation of Marshes.—*Jl Roy San. Inst.* 1937 Nov Vol. 58 No. 5 pp. 337-345 With 5 figs.

This is a very interesting description of the reclamation of marshland some two thousand acres in extent about 17 miles north of Jaffa. The necessary drainage canals were excavated by dynamite. Reeds and vegetation were cut to ground-level along the line of the proposed canal. A plank 12 feet long 1 foot wide and 2 inches thick had a row of holes 2 inches in diameter bored along the middle line, 18 inches apart. The plank was laid along the centre line of the proposed canal.

Holes in the soil were made by means of a stick pushed through the holes in the plank in these holes dynamite was inserted. The depth of the holes and the amount of the charge vary with the nature of the soil and the size of the canal desired. They are determined by trial. The procedure was continued along the length of the canal the longest length shot at one time was about 450 yards. An electric detonating cap was inserted into a stick of dynamite and this was placed in a loaded hole at the lower end of the line. A hundred yard length of duplex electric cable and a dry cell four volt battery were used for detonation. The result of detonation was an open channel with somewhat irregular margins. The canals were cut from the outfall upwards. Sixty per cent straight nitro-glycerine dynamite gave best results. This dynamite method is unsuitable in dry soil and in semi-liquid slummy parts of the marsh the explosion did not provide an effective channel. In soil of the most suitable nature will give a channel 6 feet deep 3 feet wide at the bottom and 15 feet wide at surface level. In suitable soil the cost of excavating by dynamite averaged in Palestine four pence per cubic yard the cost of excavating by hand labour is ten times as much. The work by dynamite requires a comparatively small resident staff and is of course very much more expeditious than hand work. Both these considerations are of great importance in sanitating a malarious area.

RAO (B. A.) & SWEET (W. C.) Paris Green and Paddy — *Records of the Malaria Survey of India* 1937 June-Sept Vol. 7 Nos. 2 & 3 pp 185-189

During three years observations were carried out in Mysore on the effects of Paris green dusting on rice crops more especially with regard to the rice and straw yield of the crops. It has been stated that harm may result from dusting Paris green over the open flowers of the rice plant. The observations described show that this fear is groundless. The dusting was done in the morning once weekly with a 1 per cent. Paris green mixture in road dust and wood ash in quantities usually used for larval control in this area. When the yield of plots thus treated is compared with the yield of control plots no statistical evidence is forthcoming to show that the dusting had affected adversely or otherwise the yield of rice or straw.

PRICE (Julian P) Pernicious Malaria in Children a Report of 24 Cases.—*Southern Med J* 1937 Oct Vol. 30 No 10 pp 991-996

Of the 24 cases of pernicious malaria in children reported three had haemoglobinuria eighteen were of the algid or comatose type and three had profound anaemia associated with irregular fever and marked splenomegaly. One of the latter group was an infant who died at the age of one month with anaemia splenomegaly jaundice and very numerous malarial parasites in the blood. Only 10 of the 24 patients were sent to hospital with a diagnosis of malaria and that in a part of South Carolina where physicians are accustomed to treat a great deal of malaria. Of the 24 patients seven died four within eighteen hours of admission. One boy aged 12 years was brought to

RAFFAELLI (G) Sullo sviluppo iniziale dei parassiti malarici nell'ospite vertebrato [Initial Development of Malarial Parasites in the Vertebrate Host.]—*Riv di Malarologia* Sez. I 1937 Vol. 16 No 3 pp 185-198 [27 refs.] English summary

Experiments conducted by author show that the blood of canaries which have been injected intravenously with large numbers of sporozoites of *P. praecox* is not infective to other canaries till after the expiry of three days. On the other hand the blood of birds injected subcutaneously with blood from an infected canary is infective to other birds from the first day. It would seem therefore that the sporozoites rapidly leave the peripheral blood and do not enter red blood corpuscles. Quantities of 250 cc of blood taken from human beings after intravenous injection of sporozoites do not become infective to other human beings till after four days. It seems clear that the entry of sporozoites into reticulo-endothelial cells would account for these results.

C M II

RODHAIN (J) & VALCKE (G) Schizogonie et phagocytose de *Plasmodium falciparum* dans la circulation périphérique. [Schizogony and Phagocytosis of *P. falciparum* in the Peripheral Blood.]—Reprinted from *Bull Acad Roy Méd de Belgique* 1937 Jan 30. pp 15-32. With 6 figs. & 3 charts. [12 refs.]

Four cases of severe malignant tertian malarial infection are described in all of which schizonts were present in the peripheral blood films. In three cases it was noted that the polymorphonuclear leucocytes, in particular the young forms were actively phagocytic towards the malarial parasites, an activity which was comparable with that usually displayed by the monocytes.

C M II

FRIEDMANN (J) Ueber einige Probleme der Morphologie atypischer Tertianaparasiten, insbesondere ueber das *Plasmodium oale* [Morphology of Atypical Parasites of Tertian Malaria.]—*Zucker Parasitenk* 1937 Sept 16 Vol 9 No 6 pp 583-599 With 1 text fig & 59 figs on 7 plates. [41 refs.]

The author has studied in detail, from the point of view of the occurrence of abnormal forms of the malarial parasites three strains of *Plasmodium vivax* which were employed for the treatment of general paralysis. The dried blood films investigated were stained by various modifications of the Romanowsky method and any abnormal forms of the parasite were carefully compared with corresponding normal stages. Departures from the normal were seen in all constituents of the parasites, cytoplasm, nucleus and pigment while variations in the extent of the cytoplasmic and nuclear substances and the number of nuclei were also noted. With these changes certain parasites resembled *Plasmodium oale* or the form described as *P. camerense* or even malarial parasites of monkeys. Many of these peculiar types are illustrated in black and white reproductions of coloured drawings which are in the author's possession and which he states are open to inspection by those who wish to see them.

C M II

IVANIĆ (Momčilo) Neue Beiträge zur Kenntnis der promitotischen Kernteilung beim Tertianaparasiten (*Plasmodium vivax* Grassi et Feletti) [Promitotic Nuclear Division of *P. vivax*]—Zerf. f. Bak. I Abt. Orig. 1937 Jan 15 Vol. 138 No. 3-4 pp. 254-263 With 22 figs

The author describes and figures various stages in the nuclear division of *Plasmodium vivax* which takes place by a process of mitosis. The division which is of the promitotic type resembles that of many free living amoebae of the genus *Acanthamoeba* and is characterized by the formation of a spindle within the nuclear membrane. The author thinks the appearances suggest a relationship between the malarial parasites and certain amoebae. He does not appear to have noted that many years ago SCHAUDIN described a modified mitosis in *P. vivax*. C. M. IV

ALEXEJEW & KOVACHOW Ueber die Teilung des Kerns in den Makrogametozysten des *Plasmodium falciparum* [Division of the Nucleus in the Macrogametocytes of *P. falciparum*]—Arch. f. Schiff's u. Trop. Hyg. 1937 Jul. Vol. 41 No. 7 pp. 513-517 With 15 figs

The authors have noted that in certain crescents from a number of *P. falciparum* infections evidence of binary division of the female nucleus occurs. There is elongation of the nucleus followed by its constriction into two parts. Around each daughter nucleus half the pigment granules are aggregated. From the presence in the blood films of small rounded forms of parasite each resembling half a crescent it is assumed that division of the nucleus is followed by division of the crescent. The meaning of this division is not clear but it does not resemble entirely the parthenogenesis of the female gametocyte of *P. vivax* as described by SCHAUDIN since there is no degeneration of one-half of the divided nucleus. C. M. IV

HAUER (August) Ueber neue Beobachtungen an einem *Plasmodium orale*-Stamm. [New Observations on a *P. orale* Strain.]—Arch. f. Schiff's u. Trop. Hyg. 1937 Jan. Vol. 41 No. 1 pp. 153-157 With 2 figs

The author working in Berlin obtained a strain of *Plasmodium orale* from the Hamburg Institute of Tropical Diseases for the purpose of treating general paralysis and other conditions. The strain was subjected by him by blood inoculations to a number of passages during the first 22 of which the original typical morphology was retained. At the 23rd passage it was noted that abnormal forms began to appear. These were characterized by a greater enlargement of the stippled red blood corpuscles and a merozoite number of 10, 12 and 16. An infected red blood corpuscle three times the normal size and containing two parasites each producing 16 merozoites is figured. After a further 15 passages it was noted at the 38th passage that there were indications that the strain was returning to the normal *P. orale* type. It seems that the parasite has a tendency to assume characters of both *P. vivax* and *P. malariae* but this does not mean as GIOVANNOLA holds that *P. orale* is merely a variety of *P. vivax*. C. M. IV



VOORHOEVE (H. C.) Diagnostic du paludisme au moyen de ponction sternale. [Diagnosis of Malaria by Puncture of the Sternum].—*Hæmatologica*. 1937 Vol. 18. No 7 pp 739-747 With 5 figs. [27 refs.]

Since 1929 when ARIMKIN published a description of his method of studying bone-marrow by sternal puncture, the procedure has demonstrated its utility in hæmatological research and in the diagnosis of disease of various types. The present publication describes two cases in which sternal puncture established the diagnosis of malaria one quartan the other tertian. The blood in both cases had been previously examined repeatedly, both by thick drops and smears but no malaria parasite had been found in either. The author clearly describes the simple operation of making the puncture which is done under local anaesthesia.

A. H.

VOLAVSEK (W.) Ueber die Henrysche Malaria-reaktion und ihre Beziehung zum Komplementtitre und zur Takata Reaktion. [Henry's Malaria Reaction and its Relation to Complement Titre and the Takata Reaction].—*Wien. Klin. Woch.* 1937 Nov 12. Vol. 50 No 45 pp. 1551-1552. [15 refs.]

The author concludes from his observations that —Henry's malaria reaction is always positive in cases of malaria-therapy the earliest appearance is after the third rigor and the latest after the sixth rigor. The non-specificity of the reaction so far as it is of importance limits itself to cases of liver damage, tuberculosis, carcinoma and syphilis. In cases in which Henry's reaction is strongly positive the estimation of complement and the Takata-reaction gives a positive result. Increase of the lability of the serum is of definite importance for the production of a positive reaction.

E. D. H. Gregg

BRUMPT (E.) & CHORINE (V.) La réaction de Henry chez les poules infectées avec le *Plasmodium gallinaceum*. [The Reaction of Henry in Fowls Infected with *Plasmodium gallinaceum*.]—*Ann. Parasit. Humaine et Comparée* 1937 July 1 Vol. 15 No. 4 pp. 372-379 [13 refs.]

The authors have tested the reaction of Henry in the case of serum of fowls infected or not with *P. gallinaceum*. It was found that the serum of normal fowls gave a reaction of an intensity which in the case of human malaria would have been regarded as positive. In infected birds the abundance of malarial pigment which characterizes this infection did not lead to an increase in intensity. It appears clear that malarial pigment is not in any way responsible for the reaction.

C. M. W.

GUNTHER (Carl) Malaria and its Treatment by the General Practitioner [Correspondence].—*Med. J. Australia* 1937 Aug 28. 24th Year Vol. 2 No. 9 p. 367

The author writes from New Guinea where, as medical officer of a gold dredging company, he has considerable experience in treating malaria both in whites and natives. The synthetic remedies have given very disappointing results in his hands and he regards quinine as much superior to any other drug in the treatment and prophylaxis of malaria.

N. H.

MÜLLEN (P) Chinin Nebenwirkungen [Toxic Actions of Quinine]  
—Arch f Schiffs u Trop-Hyg 1837 Dec Vol 41 No 12  
pp 710-715 With 2 figs

A record of the experiences of the author in Hamburg with cases of quinine idiosyncrasy which he met with there. He has noted natural idiosyncrasy several times in recent years. Possibly this hypersensitive-ness to quinine is inherited. So small a dose as 0.1 gm. of quinine hydrochloride may produce unpleasant symptoms in such persons. In some cases he has noted palpitation of the heart and mucous mem-branes. Haemorrhages have been a notable feature in several of the cases one case which ended fatally had severe bleeding from the nose and bowel in others haemorrhages into the skin and mucous membranes were observed. Since the use of atabrin in Hamburg and plasmoquine in the treatment of cases of malaria in his cases. For prophylaxis of malaria atabrin and plasmoquine are preferred to quinine

OESTERLIN (M) Studien zur Chemotherapie der Malaria. [Studies in Chemotherapy of Malaria].—Arch f Schiffs u Trop Hyg 1837 Dec Vol 41 No 12. pp 720-723. (28 refs)

The work of SCHULEMAN, SCHÖNHOFFER and WINGLER on methylene blue as well as his own unpublished work with Giemsa are referred to. In cell metabolism there are two processes at work a respiratory and fermentation metabolism. Methylene blue has been shown to increase the respiratory metabolism. The author found that as methylene blue had a very slight action in bird malaria it was not suitable for solving the problem of the respiratory metabolism of the parasite. From his investigations he concludes that the activity of methylene blue which is an anti-gametocidal agent can be traced to its action on the respiratory metabolism of the cell. The action of plasmoquine is important by the addition of products e.g. glucose which play an important part in cell respiration. On the other hand the action of quinine is unaltered by the addition of such respiratory metabolic products

WEISE (W) Untersuchungen ueber die Resorption und Ausscheidung des Atebrins I Methoden zur Bestimmung des Atebrins in Harn Stuhl und Blut [Methods for the Estimation of Atabrin in Urine Stool and Blood].—Arch f Schiffs u Trop Hyg 1837 Dec Vol 41 No 12. pp 715-720

In this paper the author gives full details of the chemical methods employed by him for the estimation of atabrin in the urine stools and blood of patients. He criticizes the method of WATS and GROSS for the estimation of atabrin and so vitiates the results. Those interested in urobilin as well as atabrin and so vitiate the results. Those interested should read this paper in original as it is not possible to summarize the details of the analytical methods employed by the author

E D H Greig

**TRIMPANO (Pietro)** Sul miglior modo d'impiego dell' adrenalina endovenosa nella cura della malaria acuta e del kala-azar [Best Method of using Adrenalin Intravenously in the Treatment of Malaria and Kala Azar]—*Polislinico Sez. Prat.* 1937 Aug 16. Vol. 44 No. 33 pp. 1571-1572.

The author writes of the good results he has had in the treatment of malaria and kala azar by Ascoli's method which consists in administering adrenalin as well as the specific drug. If quinine is given intramuscularly 2 to 3 hours before an attack is due in malaria adrenalin should be administered 1 to 2 hours later. If however quinine hydrochloride is given intravenously then adrenalin is given at the same time. In kala azar the treatment is similar. The adrenalin is given 1 to 2 hours after intramuscular injection of the antimony compound or at the same time when potassium or sodium antimony tartrate is given intravenously. C M W

**VOCHT (Bernard) & MAYER (Martin)** Malaria. A Handbook of Treatment Parasitology and Prevention.

This book is reviewed on p. 163.

**HORTENWEG (P. C.)** De behandeling der verschillende vormen van malaria [Treatment of the Different Forms of Malaria].—Reprinted from *Aanwinsten op Diagnostisch en Therapeutisch Gebied* Tweede Bundel. pp. 518-566 [Refs. in footnotes.]

**MAXWELL (R. D.) & HEWITT (R. L.)** Experiments in the Cultivation of the Avian Malaria Parasites.—*Amer J Trop Med* 1937 May Vol 17 No. 3. pp. 407-412. [11 refs.]

Attempts to cultivate *Plasmodium praecox* of birds did not give very satisfactory results though it was shown that under favourable conditions the introduced parasites reproduce for one and possibly for several generations. The parasites in the culture could infect canaries on the fifth day. The most satisfactory results were obtained at a temperature of 25°C. in capillary tubes containing blood which had been added to a small quantity of heparin to prevent coagulation. C M W

**MISSIROLI (A.)** Sullo sviluppo degli sporozonti di *Plasmodium praecox* (redictum) [Development of Sporozoites of *P. praecox* (redictum)]—*Riv di Malariologia* Sez. I 1937 Vol. 16. No. 3. pp. 181-184 English summary (4 lines)

The author has shown that sporozoites of *P. praecox* from the body cavity of infected mosquitoes as well as sporozoites from mature malarial cysts, will produce infection when injected into canaries. It therefore does not appear that sporozoites must undergo some form of maturation in the salivary glands before they become infective. C M W

**BRUMPT (E.)** Schizogone parfois intense du *Plasmodium gallinaceum* dans les cellules endothéliales des ponces. [Schizogony of *P. gallinaceum* in Endothelial Cells].—*C. R. Soc Biol* 1937 Vol. 125. No. 22. pp. 810-813

The author states that he has been able to confirm the observation of JAMES and TATE of the occurrence of schizonts within endothelial

cells in *P. gallinaceum* infections produced both by blood inoculations and mosquito bites. The occurrence of these schizonts is very irregular and their number bears no relation to the number of parasites in the peripheral blood. Sometimes one organ contains many, sometimes another organ while in other cases long search fails to reveal any. This failure does not mean that none may be present for it is notoriously difficult to find schizonts in many heavy *Haemoproleus* or *Leucocytozoon* infections. The irregularity of their occurrence leads the author to suspect that they do not represent an essential stage in the life cycle of the malarial parasite but are more the result of the accidental ingestion of certain forms by endothelial cells. The history of the discovery of these endothelial forms is given the credit of first seeing and describing them being undoubtedly due to RAFFAËLE who in 1934 reported such stages in *P. longatum*. A little later he encountered similar forms in *P. praecox* infections. Several instances here earlier writers had evidently seen these forms without realizing their significance are mentioned.

BRUMPT (E) Etude expérimentale du *Plasmodium gallinaceum* parasite de la poule domestique. Transmission de ce germe par *Sigomyia fasciata* et *Sigomyia albopicta*. [Experimental Transmission of *P. gallinaceum* by *Aedes aegypti* and *A. albopicta*].—Ann. Parasit. Humaine et Comparée 1936 Vol 1 No 6 pp 597-620 With 10 figs [12 refs]

In this paper the author gives an account of an experimental study of the malarial parasite *P. gallinaceum* which was described by him from fowls in 1935. He has found it possible to transmit the infection to fowls of all kinds and in addition to the goose, pheasant, partridge and peafowl. On the other hand the duck, guinea fowl, pigeon, dove, quail, buzzard, canary, sparrow, java sparrow, chaffinch and heron is at times very intense as many as 80 or 90 per cent of the red blood corpuscles harbouring parasites. In spite of this there never appears to be any rise in the temperature and indeed no signs of illness till complete development occurs in *Aedes aegypti* which easily transmits the infection. The same remark applies to *Aedes albopicta* but not to species of *Culex* in which no development could be obtained. The infection in *A. aegypti* is sometimes exceedingly heavy as many as 650 oocysts being counted on one stomach. Owing to the very limited distribution of the parasites in the fowl the author believes that some other bird will be found to be the natural host. C M H

ZIEMANN (H) Kurzer Beitrag zu den Beziehungen zwischen der Entwicklung der Hemosporidien und dem retikuloendothelialen System. [Relation of Development of Hemosporidia to the Reticulo-endothelial System.]—Zent. f. Bakt. I Abt. Orig. 1937 Oct 7 Vol. 140 No 1 pp 63-65

In connection with the discovery of intraendothelial stages of schizonts of bird-malarial parasites which have recently attracted considerable attention the author points out that in 1898 when in Heligoland he noted that he found schizonts of *Haemoproleus* only in (147)

the spleen and bone marrow of the birds be examined. He does not appear to have made any mention of such forms in *Plasmodium* infections.  
C M W

ALBRICHT (I C) & NIEUWENHUYSE (C.) De werkzaamheid van methyleenblauw op vogelmalaria [Action of Methylene Blue on Bird Malaria].—*Nederl Tijdschr v Geneesk.* 1937 Jan. 30. Vol 81 No. 5 pp. 483-488 With 1 chart. English summary (9 lines)

Methylene blue is stated to have little action on *Plasmodium praecox* in canaries but a marked action on the halteridium (*Haemoproteus oryzivorus*) infection of Java sparrows. The dye has a much better action when administered intramuscularly than when given by mouth. Methylene blue in combination with quinine is found to be much more effective on *P. praecox* infections than quinine alone. It seems therefore, that for the treatment of human malaria it is worth while investigating the effect of supplementing quinine therapy with intramuscular injection of methylene blue.  
C M W

RODRAIN (J) & HENDRIX (H) Essais de traitement du paludisme des oiseaux et des singes au moyen du "Paludex." [Trials of "Paludex" in Bird and Monkey Malaria].—Reprinted from *Bull Inst. Colon Belge* 1937 Vol. 8 pp. 137-150.

The chemical compound which has been given the trade name "Paludex" has been reported upon favourably for the treatment of malaria in the Belgian Congo. Administered alone or in combination with quinine it is said to cure all forms of malarial infection. The authors of the present paper working in Belgium have tested the drug in bird malaria (*P. cathemerium*) halteridium (*H. oryzivorus*) and monkey malaria (*P. knowlesi* and *P. gonderi*) without being able to demonstrate any favourable action. They conclude that further observations on human malaria in hyperendemic areas are required before the value of "Paludex" can be estimated.  
C M W

SIXTON (J A) Some Problems in the Host Parasite Relationship in the Malarial Infections of Man and Other Animals.—*Records of the Malaria Survey of India* 1937 Mar Vol. 7 No. 1 pp. 85-91 17 refs

The author emphasizes the importance of a study of the three malarial parasites (*P. knowlesi*, *P. cynomolgi* and *P. inui*) of *Silenus rhesus* in experimental infections in *Silenus rhesus* for many of the results obtained appear to have parallels in the case of human malaria. One important outcome of this study is the realization that one morphological species may be made of a number of different races or strains which do not protect to any extent against each other vary in virulence and respond differently to therapeutic agents. Similar races have been met with in human malaria. The host itself may have a natural resistance or an acquired resistance. Thus *Silenus rhesus* appears to be naturally tolerant of a *P. knowlesi* infection which is usually fatal, if unchecked in *S. rhesus*. Acquired resistance is seen in the resistance to superinfections of animals with a chronic infection of the same strain. The nature of this resistance is probably due at least to some

extent to the already stimulated macrophages acting in conjunction with an opsonin. Certain individuals being naturally more resistant than others it would seem that in endemic areas of human malaria the highly susceptible children die early while the more resistant ones survive and ultimately propagate their kind. C M II

RODHAIN (J) & VAN DEN BERGHE (L.) Contribution à l'étude des plasmodiums des singes africains. [Plasmodia of African Monkeys] —*Ann Soc Belge de Méd Trop* 1936 Dec. 31 Vol. 16 No 4 pp 521-531 With 12 figs on 3 plates [15 refs.]

The author discovered a malarial parasite in a monkey *Cercocebus galericulus agilis* sent to Belgium from the Congo. It was found possible to transmit the infection to monkeys of the genera *Papio* and *Macacus* but not to man. Infection in the monkeys could be cured by atebnin and plasnochin and such cured monkeys showed no immunity to *P. knowlesi*. During the growing phase of the parasite it shows some irregularity in shape but brings about little enlargement of the red cell which becomes pale with the increase in size of the parasite and dotted with irregular bluish spots which are difficult to stain. These spots do not resemble the red Schüffner dots of *P. vivax* infections. The merozoites are ten to sixteen (average twelve) in number. The pigment is of a dark brown colour. The gametocytes are round and filled with granules of pigment. The cycle of development occupies 48 hours. As regards the identity of the parasite it resembles most closely *P. inui* but this has a 72 hours cycle. The parasite appears to be identical with one described by GONDER and v. BERENBERG-GOSSLER in 1909 from *Cercocebus fuliginosus*. This was regarded by SINTON as a variety *gonderei* of *P. inui*. In view of the difference in the cycle time it would seem better to regard the parasite as a distinct species to which the name *Plasmodium gonderei* may be given.

C M IV

WEYER (Fr.) Versuche zur Uebertragung der Affenmalaria durch Stechmücken. [Attempts to transmit Monkey Malaria by Mosquitoes] —*Arch f Schiffs u Trop Hyg* 1937 Jan. Vol 41 No. 1 pp 167-172. With 4 figs.

By feeding *Anopheles (A. maculipennis)* on monkeys the author has shown that complete development of three species of monkey malarial parasite (*P. knowlesi*, *P. cynomolgi* and *P. inui*) will take place. Though the sporozoites in the salivary glands appeared to be quite normal injection of these into monkeys was not followed by infection. The reason for this is not clear. C M II

JOLLY (A M D) LAVERGNE & TANGUY. Etude expérimentale du *Plasmodium knowlesi* chez le singe et chez l'homme. [Experimental Study of *P. knowlesi* in Monkeys and Man.] —*Ann Inst Pasteur* 1937 Mar Vol. 58 No 3 pp 297-325 With 10 graphs 1 fig & 1 coloured plate. [20 refs.]

This is a careful study of *Plasmodium knowlesi* in *Macacus rhesus*, *M. cynomolgi*, *Cynocephalus papio* and man. Generally the findings are in agreement with other descriptions of this parasite, but one or two special points may be noted. The cycle of the parasite was found

## YELLOW FEVER.

- i. JAMES (S. P.) Renseignements sur la fièvre jaune reçus au cours des six mois finissant le 31 mars 1937 [Information on Yellow Fever received during the Six Months ending March 31st, 1937]—*Bull. Office Internat. d'Hyg. Publique.* 1937 June. Vol. 29 No. 6. pp. 1129-1133
- ii. SOREL Les cas de fièvre jaune dans les colonies françaises en 1936. [Cases of Yellow Fever in French Colonies in 1936.]—*Ibid* pp. 1134-1138
- iii. HABLET (J.) Sur la lésion dite "nécrose hyaline de Councilman." [The so-called "Hyaline Necrosis of Councilman."]—*Ibid* pp. 1139-1144
- iv. FINDLAY (G. M.) & MACCALLUM (F. O.) Vaccination contre la fièvre jaune au moyen du virus pantrope atténué employé seul. [Vaccination against Yellow Fever by the Use of an Attenuated Pantropic Virus alone.]—*Ibid* pp. 1145-1149
- v. BULLETIN DE L'OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE. 1937 June Vol. 29 No. 6 pp. 1150-1158.—Sur les possibilités de transport des moustiques par les aéronefs. I—Les insectes dans les aéronefs [SYMES (C. B.)] II—Mesures antimoustiques aux aérodromes. Désinfestation des aéronefs en Ouganda [DE BOER (H.)] [The Possibilities of the Transport of Mosquitoes by Aircraft. I. Insects in Aircraft. II. Antimosquito Measures at Aerodromes. The Disinfestation of Aircraft in Uganda.]
- vi. BULLETIN DE L'OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE. 1937 June Vol. 29 No. 6. pp. 1159-1185. With 3 charts.—Informations sur le degré d'infestation des pays d'Afrique par les moustiques vecteurs de la fièvre jaune. I Colonies et Protectorats Britanniques et Territoires sous Mandat Britannique [STANTON (A. T.)] II Congo Belge [VAN CAMPENHOOT (Em.)] III Colonies Françaises et Territoires sous Mandat Français [SOREL] [Information on the Degree of Infestation of African Countries by Mosquitoes Capable of carrying Yellow Fever. I. British Colonies, Protectorates and Mandated Territories. II. The Belgian Congo. III. French Colonies and Mandated Territories.]

i. The number of cases of yellow fever during the six months ending 31st March 1937 are indicated in the following table.

## South America

Country	State	No of localities with cases	No of cases	No of deaths
Brasil	Matto Grosso	4	25	9
	São Paulo	11	30	30
	Parana	1	2	2
	Minas Geraes	9	21	21
	Territ. d'Acre	1	1	1
Colombes ...	—	4	10	6

*Africa*

Country	State	No of localities with cases	No of cases	No of deaths
French West Africa	Dahomey	1	1	1
	Ivory Coast	2	3	2
	Senegal	4	7	5
	French Sudan	3	4	3
French Equatorial Africa	Gabon	1	2	1
British West Africa	Gold Coast	3	11	11
	Nigeria	3	3	2
	Sierra Leone	1	1	0

The author discusses recent literature on the epidemiology with special reference to the possibility of vertebrate hosts other than man serving as reservoirs of the infection and refers to FINDLAY'S observation that 20 out of 88 monkeys caught in endemic areas in Africa gave positive protection tests whilst the sera of monkeys from Kenya, India and Java were negative. The specificity of the protection test seems to be somewhat doubtful when applied to other animals such as cattle for Findlay obtained the following results with their sera using the intraperitoneal method of mouse protection against yellow fever virus.

Country of Origin	No of sera tested	Number protecting	Number not protecting
England	119	1	118
France	12	0	12
India	40	3	37
Sierra Leone	16	1	15
Gold Coast	14	0	14
Kenya	88	12	76
Uganda	22	13	9
Anglo-Egyptian Sudan	30	3	27
Total	341	33	308

ii. The author summarizes the records of the cases of yellow fever occurring in French Colonies during 1936 24 cases as compared with 14 the previous year. Eighteen of these were Europeans with 13 deaths 4 were Syrians and 2 natives all fatal. The difficulty of finding the source of the infection is emphasized by giving histories of some of these cases. One missionary who had lived 30 years in Africa on various occasions in the midst of yellow fever epidemics without showing any signs of infection remained in Paris for one year and on his return to the French Sudan died of yellow fever within a month. Of especial interest is the record of a patient who had been vaccinated against yellow fever by Dr LAIGRET on August 2nd, 1934 and on August 25th and September 27th by Dr DABBADIE. She became ill on October 2nd, 1936 and died of typical yellow fever on the sixth day.



SOPER (Fred L.) The Geographical Distribution of Immunity to Yellow Fever in Man in South America.—*Amer J Trop Med* 1937 July Vol. 17 No. 4 pp. 457-511 With 16 maps. [23 refs.]

A report giving the results for South America (Brazil, Paraguay, Bolivia, Chili, Peru, Ecuador, Colombia, Venezuela, British Dutch and French Guiana) of the world survey of yellow fever immunity distribution carried out by the Rockefeller Foundation with the co-operation of the governments concerned. The report should be consulted in its entirety by those interested in the subject as it comprises numerous tables giving details of the results of protection tests with sera collected from these various countries.

The author's main conclusions are that the reported incidence of yellow fever is no safe index of its occurrence in endemic zones, and although visible urban and maritime outbreaks may decline and even cease for a time there is a vast silent reservoir of infection in the interior of South America. Yellow fever infection due to *Aedes aegypti* has been much more widespread than was believed even in areas under special observation and fever transmitted by this mosquito did not spontaneously disappear following the organization of anti-mosquito campaigns in the principal centres of population.

Yellow fever endemicity instead of being limited to the coast of North-East Brazil, extends to all Brazil, except a few of the southern States, and to Bolivia, Paraguay, Peru, Ecuador, Colombia, and Venezuela, involving many districts in which *Aedes aegypti* does not exist.

Widely varying percentages of immunes have been found in proved endemic areas depending upon whether transmission is due to *Aedes aegypti* or occurs in its absence.

There is no evidence of recent outbreaks of the disease in any of the important Pacific or Caribbean ports of South America. E H

SOROKA (Fred L.) Epidemiologia da febre amarela.—*Folha Med* 1937 July 25 Vol. 18 No. 21 pp. 423-430 [24 refs.]

STEFANOPOULO (G. J.) Résultats fournis par l'application du test de séroprotection contre la fièvre jaune sur les indigènes de l'Afrique Equatoriale française (Juillet 1935-Janvier 1936) [Results furnished by the Application of the Serum Protection Test against Yellow Fever on Natives of French Equatorial Africa (July 1935-January 1936)]—*Ann de Méd et de Pharm Colon* 1937 Jan-Feb-Mar Vol. 35 No. 1 pp. 74-87 With 2 maps [Refs. in footnotes.]

An account of the author's investigations on the epidemiology of yellow fever in French Equatorial Africa, in which he gives details of the results of mouse protection tests with the sera of natives collected in various parts of the region. The results are of especial interest since no case of yellow fever has ever been notified from among any of the white inhabitants of this Province. Nevertheless the percentage of sera giving positive protection tests was found to reach as high as 46.1 per cent. in the Middle Congo and 55 per cent. in one department of Tchad Region. Moreover the classification of the results according to age groups shows that the disease must still be present, since in some departments the infants gave positive protection tests.

The author discusses the specificity of the test and gives a list of 24 diseases and also various antisera all of which gave negative results when tested for the presence of protective bodies against yellow fever virus in mice. His evidence supports the generally accepted view that the test is sufficiently specific to be of value in determining the distribution of yellow fever. E H

PELTIER (M) DURIEUX (C) & MARTIN (J) Etude rétrospective d'une épidémie ayant sévi en 1932 dans la région nord de la Guinée française [A Retrospective Study of an Epidemic occurring in 1932 in the North of French Guinea.]—*Bull Soc Path Exot* 1937 Oct 13 Vol. 30 No 8. pp 608-611

During 1932 an epidemic broke out in three districts in the North of French Guinea with a total of 8 600 cases and 1,540 deaths in three months. The epidemic was supposed to be due to influenza without pulmonary symptoms but the authors bring forward evidence including the results of recent protection tests in support of their view that this was probably an outbreak of yellow fever. E H

WALCOTT (A M) CRUZ (Edgar) PAOLIELLO (Adhemar) & SERAFINI (José) Jr An Epidemic of Urban Yellow Fever which Originated from a Case contracted in the Jungle—*Am J Trop Med* 1937 Sept Vol. 17 No 5 pp 677-688 With 2 maps [11 refs]

A detailed description of a small epidemic of yellow fever occurring in the town of Cambará Paraná during the first three months of 1936. The outbreak was limited to nine cottages in a small area infested with *Aedes aegypti* and of the 47 inhabitants 25 were attacked by the urban form of the disease. The authors bring forward convincing evidence in support of their view that this epidemic originated from a labourer who had acquired infection when working in the jungle but passed his illness in one of the above mentioned houses. All the nine timber cutters with whom this labourer had been working furnished histories of a disease clinically diagnosed as jungle yellow fever and the blood of the five examined all gave positive protection tests. None of them had visited Cambará or was known to have been in any place where urban yellow fever was known to exist.

The interval from the onset of this jungle case to the development of the urban cases presumably transmitted by *Aedes aegypti* was 17 days which corresponds to the usual incubation period in the mosquito plus the additional incubation period in man. The first three cases occurred in close neighbours on the same premises and the epidemic developed among persons living in near by houses who had not been absent from Cambará for three weeks previously. The outbreak was of the usual urban type two cases being fatal, and promptly subsided upon the introduction of adequate measures against *Aedes aegypti*. E H

FLU (P C.) Enkele beschouwingen over gele koorts in Suriname. [On Yellow Fever in Surinam.]—*Geneesk Tijdschr v Nederl-Indië* 1937 June. Vol. 77 No 23 pp 1411-1422.

Surinam in Dutch Guiana was visited in 1902 and 1908 by epidemics of yellow fever. In the first of these Flu was himself a sufferer from an

MATHIS (Maurice) Etude d'une souche de virus amaril isolée directement du sang de l'homme par inoculation intra-cérébrale à la souris blanche (avec remarques de M. C. MATHIS) [The Study of a Strain of Yellow Fever Virus Isolated Directly from Human Blood by Intracerebral Inoculation into White Mice (with Remarks by M. C. Mathis)]—*Bull Soc Path Exot* 1937 July 7 Vol. 30. No. 7 pp. 525-532.

The main interest of this case from Senegal lies in the fact that none of the clinical symptoms of the patient given *in extenso* was characteristic of yellow fever. A monkey *Macacus rhesus* inoculated with blood collected on the second day of illness died of yellow fever four days later and six mice inoculated intracerebrally each with 0.1 cc of the same lot of serum, died of encephalitis after 10 to 17 days. This "Riou strain" has been passed through mice for 40 passages and is a typical neurotropic strain of yellow fever.

In the discussion attention is drawn to the well known fact that in patients infected with yellow fever all the characteristic symptoms may be absent including jaundice, black vomit and even albuminuria. The use of mice instead of monkeys for the experimental diagnosis of doubtful infections is of great practical convenience. E H

NICOLAU (S.) MATHIS (M.) & BAFFET (O.) Altérations histologiques et présence d'inclusions amariles dans l'encéphale de l'homme mort de fièvre jaune [Histological Changes and the Presence of Yellow Fever Inclusion Bodies in the Brain of a Man Dead of Yellow Fever]—*Bull Soc Path Exot* 1937 Oct 13 Vol. 30. No. 8 pp. 615-618 With 2 figs.

The authors obtained the whole brain from a fatal case of yellow fever and give an account of the histological changes based on the examination of sections from 17 different regions.

The meninges as a rule appeared normal but there was a great proliferation of glial cells in the grey matter and also in the white substance accumulating round the vessels to form more or less complete perivascular cuffs. This may be accompanied by infiltration of mononuclears, and occasionally a nerve-cell may be surrounded by 4 to 8 of these mononuclear phagocytes.

The nerve cells in all parts of the brain show the characteristic intranuclear bodies which seem to be more numerous than in the brains of monkeys dying of yellow fever. In addition the glial cells often show inclusions especially in the cortex of the brain. E H

MONTENEGRO (João) Diagnostico anatomo-patologico da febre amarella [Diagnostic Value of the Histological Changes in Yellow Fever]—Reprinted from *Archivos Hyg e Saude Publica* São Paulo 1937 Vol. 3. pp. 109-119 With 3 coloured plates. [31 refs.] English summary.

This article is illustrated by coloured plates showing the changes in the liver occurring in jungle yellow fever. The liver is the only viscus dealt with in detail, but the author states that in four cases in which the kidney tissue was examined calcareous deposits were seen.

The paper is based on histological examination of 182 cases of suspected jungle yellow fever occurring in São Paulo in the period December 1935-February 1937. He compares the changes found in

yellow fever with those of infectious jaundice (Weil's disease) and typhus. Among the 182 were 105 regarded as positive i.e. from cases of yellow fever. No differences could be detected between the lesions of the jungle (rural) type and the urban. The author regards the following changes as characteristic and their diagnostic importance in descending order of value: 1. The Councilman Rocha Lima cell [i.e. liver cells containing the Councilman bodies]. 2. The Rocha Lima type of zonal necrosis. 3. General disorganization of the liver parenchyma. 4. Fatty changes. He estimates the Torres nuclear inclusions as of high diagnostic value if present but they are not seen in all cases. H H S

NICOLAU (S) & BAFLET (O). Fièvre jaune inapparente révélée par la présence de lésions et d'inclusions dans le système nerveux des chiens inoculés avec le virus amaril. Insensibilité du chat à l'égard de l'action pathogène de ce même virus. [Non-apparent Yellow Fever Identified by the Presence of Lesions and Inclusion Bodies in the Nervous System of Dogs Inoculated with Yellow Fever Virus. The Non-susceptibility of the Cat concerning the Pathogenic Action of this Virus.]—*Bull Soc Path Exot* 1937 Oct 13 Vol. 30 No 8. pp 611-615. With 2 figs.

Six two-months-old puppies were inoculated intracerebrally with yellow fever virus cultivated in the brains of guinea-pigs. None of the animals showed any signs of infection but five were killed at intervals of 8, 9, 11, 14 and 19 days after inoculation and their brains examined. All were found to show parenchymatous lesions of encephalitis and the nerve-cells contained the characteristic intra-nuclear bodies. Nevertheless virus was not recovered from the central nervous system of these animals. Intracerebral inoculations into mice being uniformly negative.

Four kittens similarly inoculated at the same time as the puppies not only showed no signs of infection but also no trace of any lesions in the central nervous system and would seem to be completely refractory to neurotropic yellow fever virus. E H

HOFFMANN (W H). Some Experiences of Yellow Fever Endemicity in Africa and America.—*Jl Trop Med & Hyg* 1937 July 1 Vol. 40 No 13 149-154.

General reminiscences in which the author mentions that since 1924 systematic histological examinations for yellow fever have been made on post mortem material from West Africa and South America resulting in the discovery of endemic infections in these two regions. For practical purposes the histological method of diagnosis is advocated as the most reliable and quickest way to make the early diagnosis of yellow fever especially of early epidemic cases in countries with a latent endemic infection. E H

FINDLAY (G M) & MACCALLUM (F O). Note on Acute Hepatitis and Yellow Fever Immunization.—*Trans Roy Soc Trop Med & Hyg* 1937 Nov 30 Vol. 31 No 3 pp 297-308 [31 refs.]

During the past four and a half years approximately 2,200 persons have been immunized against yellow fever and careful records kept

yellow fever was so prevalent in South America that a voyage to Brazil was regarded as a veritable death cruise since approximately 50 per cent of the personnel of these ships used to succumb to the disease.

By the adoption of anti mosquito measures on board, the "Orion" visited various infected ports including a 14 days stay at Santos, without any cases of yellow fever occurring among the crew E H

PUBLIC HEALTH REPORTS. 1937 July 30. Vol. 52. No. 31  
pp 1027-1030—Preventing the Spread of Yellow Fever through Air Traffic.

With a view of taking steps to prevent the international spread of yellow fever by air traffic an arrangement has been entered between the Pan-American Sanitary Bureau and the Pan-American Airway System which will be extended to other international airplane services in the Western Hemisphere

Each passenger is required to carry the following certificate —

Pan-American Sanitary Bureau.	Issuing agency	...
	Place	.. ..
	Date issued	.. ..

#### CERTIFICATE OF ORIGIN OF PASSENGER.

(To be filled in by agency issuing airplane passage)

NOTE This certificate is a personal one and should be retained by the passenger along with vaccination and health certificates.

Name of passenger		
Where does voyage begin ?	Date	
Where does voyage end ?	Date	..
Will voyage be direct, or will there be stopovers ?		
Places of stopover	Date of arrival	Date of departure
		..

Where does passenger reside when at home ?  
On what date did passenger arrive in city where he will embark ?  
Give localities visited or resided in for 6 days prior to embarkation

1st day	4th day
2nd day	5th day
3rd day	6th day
	.. . . .

REMARKS Persons who can present satisfactory evidence that they have had yellow fever or who can present certificates of vaccination against yellow fever will not need Certificate of Origin

This form will not be required of international passengers originating south of 30° south latitude unless they make stopovers in the area north of this parallel in excess of 1 day while en route to their destination.

E.H

WHITMAN (Loring). The Multiplication of the Virus of Yellow Fever in *Aedes aegypti* — *Jl Experim Med* 1937 Aug 1 Vol. 66.  
No 2 pp 133-143

The author fed various lots of *Aedes aegypti* on monkeys infected with the Anbl strain of yellow fever virus, and using mice titrated the amount of virus present in the mosquitoes after various intervals

following their infection. Although variations of unexplained origin occurred the results clearly show that following the ingestion of infected blood the virus content falls for some days, reaching a minimum during the first week. It then increases rapidly until quantities of virus greater than those previously encountered can be demonstrated but the actual final amount of virus is subject to considerable variation.

The results of a typical experiment are shown in the following table —

*Titres of virus in Aedes aegypti at various intervals after infection*

Time after feeding Days	Titres obtained with two lots of 30 mosquitoes each	Average titre
0	22,000 146 500	84 250
3	900 360	630
10	16 000 3 500	9 750
24	24,800 24,800	24 800
38	1,275 000 160 000	717 500

These results agree with the opinion of SELLARDS [see this *Bulletin* 1935 Vol. 32 p 592] that such multiplication occurred and are opposed to the conclusions arrived at by DAVIS FROBISHER and LLOYD [see this *Bulletin* 1934 Vol. 31 p 81] E H

SELLARDS (Andrew Watson) & BENNETT (Byron L.) *Vaccination in Yellow Fever with Non-Infective Virus.*—*Ann Trop Med & Parasit* 1937 Oct 22. Vol. 31 No 3 pp 373-378

Using the French neurotropic strain of yellow fever virus at varying intervals from the 271st to the 350th passage in mice the authors have prepared 20 per cent suspensions of the infected mouse brains in physiological saline containing 1 per cent phenol. The suspension was kept for 6 days at 37°C. when it was found to have lost its virulence completely and then stored at 4°C.

Thirty five mice inoculated with repeated doses of this vaccine were subsequently tested for immunity. Twenty-one of these animals survived whilst out of 31 controls only 2 survived. The vaccine was also injected into 2 rabbits which developed somewhat transitory protective bodies in their sera. A vaccine was also prepared by adding cysteine to the above mentioned phenol suspension. This substance was found to increase the efficiency of the vaccine probably by restoring some of the lost antigenic activity.

Finally the author discusses the technical difficulties of immunization with killed viruses. E H

ROUBAUD (E.) STEFANOPOULOS (G. J.) & FINDLAY (G. M.) Essais de transmission par les stégomyies du virus amaril de cultures et tissu embryonnaire. [Attempts to transmit Yellow Fever Virus to Embryonic Tissue Cultures by Means of Mosquitoes (*Aedes*)]—*Bull Soc Path. Exot.* 1937 July 7 Vol. 30 No. 7 pp. 581-583.

The authors fed various lots of *Aedes aegypti* originally from Cuba Assam and Tanganyika, respectively on monkeys inoculated with culture virus that had been kept for long periods either in mouse embryo tissue and then fowl embryo tissue or in the latter alone. In every case virus was present in the circulating blood of the inoculated monkey yet none of the mosquitoes which fed on these animals became infective, as tested by keeping the insects at 28° to 30°C. for 7 to 37 days and allowing them to feed on normal monkeys. It would seem therefore that this culture strain of virus is not transmissible by the bites of mosquitoes.

E. H.

FINDLAY (G. M.) & MACCALLUM (F. O.) Yellow Fever Immune Bodies in the Blood of African Primates.—*Trans. Roy Soc Trop Med & Hyg* 1937 June 25 Vol. 31 No. 1 pp. 103-106.

An examination by the mouse protection test of the sera of 67 wild African monkeys all from areas where immune bodies have been found

*Yellow Fever Immune Bodies in the Sera of African Monkeys*

Locality	Species	Number of sera examined	Number of sera protecting	Number of sera not protecting
Anglo-Egyptian Sudan	<i>Galago senegalensis senegalensis</i> Elliot	3	0	3
	<i>Erythrocebus patas</i> Elliot	1	0	1
	<i>Cercopithecus anthiops centralis</i> Neumann	15	1	14
Sierra Leone	<i>Colobus vellerosus</i> Elliot (= <i>polykomos</i> , Schwarz)	1	1	0
Liberia	<i>Cercopithecus</i> sp.	10	4	6
Gold Coast	<i>Cercopithecus</i> sp.	1	0	1
	<i>C. diama diama</i>	1	1	0
	<i>Erythrocebus patas</i> Elliot	1	0	1
	<i>Colobus vellerosus</i> Elliot (= <i>polykomos</i> Schwarz)	5	3	2
	<i>Procolobus badius badius</i> Pocock, 1935	6	3	3
	<i>P. badius waldroni</i> Hayman	3	1	2
Uganda	<i>Cercopithecus anthiops centralis</i> Neumann.	20	5	15
	Total .. ..	57	19	48

in the blood of human beings showed the presence of yellow fever immune bodies in 19 individuals belonging to 7 different species as indicated in the table above

If these results are combined with those previously recorded out of a total of 92 African monkeys, 22 or approximately 23 per cent have shown yellow fever immune bodies. In view of the essentially domestic character of *Aedes aegypti* it would seem probable that under natural conditions other mosquitoes must be regarded as potential vectors of yellow fever

E H

MACCALLUM (F O) & FINDLAY (G M) Yellow Fever Immune Bodies and Animal Sera.—*Trans Roy Soc Trop Med & Hyg* 1937 July 31 Vol. 31 No 2 pp 199-206

Employing the usual mouse protection test the authors have examined the sera of various wild animals and also of cows and sheep for the presence of protective antibodies against yellow fever virus. The following wild animals from Sierra Leone and the Gold Coast were examined with uniformly negative results —Bush rat *Mastomys erythroleucus* (9) field rat *Arvicanthis occidentalis* (1) ground pig *Crictomys gambianus* (2) and antelopes (3)

The results with cattle sera from various localities have been given above [see p 111]

The results of the examination of cattle sera from Kenya are of especial interest as the possibility of their having been exposed to infection cannot be entirely excluded. Out of 175 sera from areas where yellow fever is not known to be present in man 13 sera (7 per cent.) were finally positive and of these 13 sera 11 came from an area in Kenya near the Uganda border Out of 70 sheep sera from Kenya 3 protected. Two from Uganda were negative

A two-months-old calf injected subcutaneously with the Asibi strain of yellow fever virus showed no febrile reaction but virus was present in the circulation after four days though not after six days A second injection three weeks later failed to produce any febrile reaction but the serum examined three weeks later protected in a dilution of 1/16

It seems impossible to interpret these results in the present state of our knowledge for in Uganda where the percentage of positive human sera is small the percentage of cow sera protecting is large whilst in the Gold Coast where there is a much higher proportion of positive human sera the cattle sera were all negative It would seem probable that virucidal properties may appear in cattle under certain physiological conditions or as the result of bacterial or virus infections other than yellow fever

E H

WOKB (P A) Comparative Effects of the Blood of Different Species of Vertebrates on Egg-Production of *Aedes aegypti* Linn.—*Amer J Trop Med* 1937 Sept. Vol. 17 No 5 pp 729-745

Batches of *Aedes aegypti* comprising from 23 to 28 individuals in each lot were fed on the blood of various species of animals in order to determine whether there were any significant differences in the number of eggs laid. By weighing the mosquitoes before and after



each blood-meal the average number of eggs per mgm. of blood was estimated in the following seven species —

*Average Number of Eggs per mgm. of Nutrient.*

Animal	After 1st blood meal	After 2nd blood meal	Average for both blood meals
Man	34.0	24.0	29.3
Monkey	31.5	24.6	28.2
Rabbit	53.2	44.1	48.9
Guineapig	55.3	49.2	52.4
Canary	48.8	35.6	42.4
Turtle	50.2	41.9	46.3
Frog	58.2	47.0	53.6

It will be seen that significantly greater numbers of eggs are produced on the blood of the turtle frog canary rabbit and guineapig than on human or monkey blood.

E H

## RELAPSING FEVER AND OTHER SPIROCHAETOSSES

ANDERSON (Charles) & SICART (Marcel) Nouveaux cas de fièvre récurrente hispano-africaine observés dans un même foyer du nord de la régence. Etude des virus isolés. [New Cases of Spanish-Moroccan Relapsing Fever observed from the Same Centre in the North of the Regency Study of the Strains Isolated.]—*Arch Inst Pasteur de Tunis*. 1937 June Vol. 26 No 2. pp 250-256

During 1935 and after a year's interval in 1936 several cases of relapsing fever occurred in a small mud hut at Furna in the north of Tunisia. The patients showed similar symptoms the most striking being the sudden onset and especially articular and muscular pains. Treatment with arsenicals (914 acetylarsan sulpharsenol) gave no appreciable results but Guiart's pills were found to shorten the convalescent period.

Gumepigs were infected from one of the 1935 and one of the 1936 cases and from a study of its cross-immunity reactions the spirochaete found to be typical *S. hispanica*. Transmission experiments were made with various carriers. *O. erraticus* was found to produce the infection both by bite and also by the inoculation of its contents. *Pediculus humanus* fed on infected blood produced infection in gumepigs by inoculation of the emulsified lice but feeding experiments could not be carried out owing to the absence of monkeys.

*Xenopsylla cheopis* was also shown to be a natural carrier of the infection for a normal rat separated from an infected one by a double wall of wire netting acquired the infection when these fleas were placed in the cage.

A single attempt at transmission by *Rhipicephalus sanguineus* gave negative results. E Hindle

JAHNEL (F) Ueber das Ueberleben von Syphilis- und Recurrens-spirochäten sowie Sodokuspirillen in flüssigem Stickstoff (Temperatur  $-196^{\circ}$ ) und die Einwirkung anderer Kältegrade auf diese Mikroorganismen. [The Survival of Syphilis and Relapsing Fever Spirochaetes, and also Sodoku Spirilla in Liquid Nitrogen (Temperature  $-196^{\circ}$  C) and the Influence of Other Degrees of Cold on these Micro-organisms.]—*Klin Woch* 1937 Sept 18 Vol. 16 No 38 pp 1304-1305

The author confirms previous observations on the survival of various trypanosomes and spirochaetes after being frozen and finds that in the case of relapsing fever spirochaetes also *Spirochaeta pallida* and *Spirillum minus* these organisms survive at a temperature of  $-196^{\circ}$  C. for at least 14 days.

[The reviewer previously recorded the survival of *S. pallida* and other spirochaetes at temperatures of  $-10^{\circ}$  C even when dried *in vacuo* (See this *Bulletin* 1934 Vol. 31 p 512)] E H

KJEN HUN (Bau) Interferenzversuche bei Spirochäteninfektionen (Mäuserekurrens und Kaninchensyphilis) [Interference Studies on Spirochaetal Infections. (Mouse Relapsing Fever and Rabbit Syphilis.)]—*Ztschr f Immunitätsf u Experim Therap* 1937 July 8. Vol. 90 No 5/6 pp 482-493 [19 refs.]

The author has studied the interference effect of brilliant green on the spirochaeticidal action of Solganal in mice infected with various

strains of relapsing fever. The brilliant green was generally administered subcutaneously followed four hours later by an intravenous injection of Solganal.

In the case of mice infected with a European strain of *S. recurrentis* the administration of brilliant green produced complete interference of the spirochaeticidal action of Solganal, although it did not diminish its toxic properties. On the other hand in the case of mice infected with *S. norys* and *S. hispanica* no interference phenomena were observed and the Solganal was equally effective in mice that had been previously treated with brilliant green and in untreated controls. This dye also produced a slight diminution of the effectivity of Solganal in mice infected with the *crocidurae* strain of *S. duttoni*.

In the case of rabbits infected with Truffi and "Nichols" strains of *S. pallida* treatment with brilliant green was found to diminish the curative action of Solganal very markedly. In this case the dye was administered not only four hours before the Solganal but also in addition three or five days later.

Tests were made with numerous dyes known to produce interference phenomena against trypanocidal agents in mice infected with trypanosomes, but in no case was any substance found which in any way diminished the curative action of neosalvarsan in mice infected with relapsing fever. E H

PAI (S. E.) Wassermann and Kahn Reactions in Relapsing Fever — *Chinese Med J* 1937 Oct Vol. 52. No. 4 pp. 595-598.

An examination of 13 non-leucic cases of infection with a Chinese strain of *Spirochaeta recurrentis* in order to determine whether positive Wassermann or Kahn reactions occur in this disease. Five cases gave positive Wassermann reactions during the febrile stage and one during the afebrile period between relapses. The Kahn tests with this series were all negative except one which gave a strong reaction and another a weak reaction. Four untreated and three treated cases gave negative reactions with both tests also three of the positive cases re-examined after a single dose of specific injection were also negative. E H

### RAT BITE FEVER.

JAHMEZ (F) Ueber den Einfluss des Winterschlafes auf die Sodoku Infektion [The Influence of Hibernation on Sodoku Infection]. — *Ztschr f Immunitäts u Experim Therap* 1937 Oct. 15. Vol. 91 No 4 pp 318-323 [14 refs.]

Dormice were infected with the Elberfeld strain of *Spirillum minus* and when the infection was well developed, the animals placed in a cold room to induce hibernation. In all cases it was found that the infection died out very quickly during hibernation. Inoculations of the blood, brain and internal organs were made from infected dormice after varying intervals from the beginning of hibernation and in one instance even after 24 hours the infection was found to have died out. These results agree with previous observations on the effect of hibernation on infections with *Spirochaeta pallida* or trypanosomes.

There is no obvious explanation of this curative effect of low temperatures, for *S. minus* will withstand  $-196^{\circ}\text{C}$  for at least 14 days. It is possible that the lower temperature of hibernating animals by inhibiting the multiplication of the parasites may enable the natural defence mechanism of the organism to effect a cure. *E Hindle*

## LEPTOSPIROSIS

DAS GUPTA (B. M.) & CHOPRA (R. N.) The Occurrence of Weil's Disease in India.—*Indian Med Gaz* 1937 Oct Vol. 72. No 10 pp 610-612. [10 refs.]

The record of a case of Weil's disease in a Calcutta patient. The causative organism was recovered from the blood (culture) and urine but attempts to infect guineapigs were unsuccessful. Although the disease has been previously recorded in India on clinical grounds this seems to be the first time that leptospirae have been recovered from a case. *E Hindle*

BEIGLBÖCK (W.) Ueber die Leptospirosen Menschen insbesondere den Morbus Weil. [Human Leptospiroses, especially Weil's Disease].—*Wien Klin Woch* 1937 Juli 23 Vol 50 No 29 pp 1088-1093. [50 refs.]

A general review of the subject

*E H*

VAUCEL (M.) Essai d'identification d'un leptospire isolé à Hanoi au cours d'une affection humaine ictérique. Spécificité de type. [An Attempt to Identify a *Leptospira* Isolated in Hanoi during the Course of an Attack of Human Jaundice. Specificity of the Type].—*Bull Soc Méd-Chirurg Indochine* 1937 Apr Vol 15 No 4 pp 385-392. With 2 charts

Details of laboratory tests with a strain of leptospira isolated from a fatal case of Weil's disease in a European at Hanoi [see this *Bulletin* 1937 Vol. 34 p 708]

This strain named *Leptospira K* in its pathogenic properties and agglutination reactions was found to be very distinct from the strains of *L. icterohaemorrhagiae* kept at Hanoi. It resembled *L. hebdomadis* in its low virulence but was serologically distinct. Agglutination reactions suggest that it is most closely related to *L. autumnalis* but possesses a higher pathogenicity.

Agglutination tests were made with 100 samples of sera collected at Hanoi using various strains of leptospira. Forty-three of these were positive. Three agglutinated *Leptospira K* exclusively up to 1/1 000. 1 agglutinated *Leptospira K* up to 1/15 000. *L. autumnalis* to 1/2 000 and *L. icterohaemorrhagiae* to 1/1 000. 1 reacted with *L. K* up to 1/10 000 and with *L. autumnalis* 1/5 000 and *L. icterohaemorrhagiae* to 1/1 000. Out of 31 cases agglutinating *L. icterohaemorrhagiae* 12 contained co-agglutinins for *Leptospira K* up to 1/1 000 but of 7 agglutinating *L. autumnalis* two had the same titre for *L. K* and four other cases contained co-agglutinins against this strain. *E H*

DAHR (Peter) Ueber das vorkommen von Antikörpern gegen *Spirochaeta sclerogenes* und *Sp. canicola* bei Hunden. [The Prevalence of Antibodies against *Spirochaeta sclerogenes* and *S. canicola* in Dogs.]—*Klin. Woch.* 1937 Oct. 23 Vol. 16 No 43 pp 1491-1492. [15 refs.]

The author gives the results of agglutination and lysis tests of the blood of 200 dogs, including 14 different breeds in Cologne showing the prevalence of infection with *Spirochaeta* (*Leptospira*) *sclerohaemorrhagiae* and *S. canicola*. Only 10 sera were positive and of these 6 reacted with both strains of spirochaete. 1 serum reacted only with the Weil type and 3 only with the *canicola* type. The titre of the immune serum reached a strength of 350 in two of these *canicola* infections, but in most cases did not exceed 50. It would seem, therefore that in this district the infection is not very severe in dogs and also rather uncommon.

E H

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## MISCELLANEOUS

TATE (P) A Method of labelling and protecting Blood Films —  
*Trans Roy Soc Trop Med & Hyg* 1937 June 25 Vol 31  
No 1 p 118

In cases where there is an objection to labelling a blood film by scratching the record at one end the following is recommended. The necessary information is written on the label with Indian ink and the ungummed label fixed to the slide with cellulose lacquer and when dry the whole is covered with a thick coating of Durofix or other cellulose preparation. Immersion oil and xylol do not injure the labels of slides so treated nor is the definition of blood cells or organisms interfered with for microscopic examination. Slides stained by Giemsa or Leishman's method have faded no more than uncoated films even after being kept for more than a year. [See also this *Bulletin* 1936 Vol 33 p 227] H H S

ROSENTHAL (David B) The Influence of External Temperature on the Blood Sedimentation Rate.—*Med Jl Australia* 1937 Jan 30 24th Year Vol 1 No 5 pp 172-178. With 1 fig & 7 charts. [13 refs]

During an investigation of certain physico-chemical factors in the blood sedimentation rate the author confirmed the view of GORDON and CONN WALTON and others that the temperature at which the test was conducted markedly influenced the result. This change in sedimentation rate was regarded as dependent in part at least on the changes in the viscosity of the blood plasma. Cutler's technique was used for measuring the sedimentation rate the important points being (1) the shape of the curve (2) the sedimentation index i.e. the height of the column of clear plasma at the end of one hour and (3) the sedimentation time which was defined by Cutler as the number of minutes that elapse before the period of packing of the red blood cells sets in. In the various experiments the tubes were floated in conical flasks containing water at the temperature chosen 40°F 60°F 80°F and 100°F. The tubes were passed through and supported on broad cork floats and 1 cc. of citrated blood was poured into each tube measurements being made every five minutes on Cutler's graph paper. In all sedimentation curves three phases were recognized. First a slow phase usually of short duration secondly a phase in which the velocity of fall has reached its maximum and is regular thirdly a phase of slowing which goes on till fall ceases (packing). The lengths of the second and third phase are in inverse ratio to one another and depend on the summation of the effects due to the height of the column and the cell volume for the particular specimen.

The results of various experiments showed that within certain limits the higher the temperature the more rapid the fall and that the change in rate was roughly proportioned to the change in temperature. Temperatures equal to or exceeding 110°F (43.3°C) gave very irregular results owing to chemical changes in two phases of the suspension. Since laboratory work is done at variable temperatures at different seasons and in different parts of the world, it is important that some thermometric standardizations of the test be adopted.

(PETRISTISCHEVA, p. 185 P and BREGETOVA, p. 211) with the sandfly larva of various districts. G. ZMERV ("Les insectes synantropes comme hôtes intermédiaires et hôtes vecteurs des helminthes au Tadjikistan" pp. 241-248) records the finding of helminth eggs in various insects associated with man. In another contribution ("Le bothriocephale au Tadjikistan" pp. 267-274) the same author discusses the identity of the *Diphyllbothrium* found in Tadjikistan dogs and jackals and concludes that they represent *D. ranarum*. The remaining two papers are of purely zoological character.

C. A. Hoare

[Parasitological Symposium of Uzbekistan.] Publ. by Inst. of Epidemiol. & Microbiol. and Tropical Inst. Tashkent. Vol. I. 1936. 496 pp. [In Russian.]

This volume contains collected papers on parasitological subjects connected with tropical medicine by members of the staffs of the Institute of Epidemiology and of the Tropical Institute of Tashkent and of various research laboratories in Uzbekistan (Middle Asia, U.S.S.R.). The following papers are mainly of local interest and can be referred to by title only for bibliographical purposes.

M. P. MEVZOS "Epidemiological observations on malaria and anti-malaria measures in Uzbekistan in 1935" (p. 6). M. E. TIMOFEJEVA, "The fight against malaria in the Middle Asia textile combine of Tashkent in 1935" (p. 26). V. TELTSOV "Experiment on dusting from aeroplanes in the steppes, 1932-35" (p. 40). MAGNITSKY

"Observations on the zooprophyllaxis of malaria in Middle Asia" (p. 67). I. V. GUSEV "Fauna of culicid mosquitoes at various points of the Middle Asia railway" (p. 85). N. I. KHODUKIN and E. J. STERNHOLD "Zoophylism and anthropophylism in certain *Anopheles* of Middle Asia" (p. 85). P. P. CHIRAJEV "Key to the larvae of the *Anopheles* of Uzbekistan in all stages of development determined by the hairs of the head" (p. 139). "The differentiation of the larvae of *An. algeriensis* and *An. bifurcatus* by the structure of the stigmal plate" (p. 144). A. I. LISOVA "Variation in the eggs of *Anopheles superpictus*" (p. 146). "Materials on the biology of *A. superpictus*" (p. 153). "Variation of the eggs of *A. superpictus* in the light of racial studies" O. SOLODOVNIKOVA "The physiological state of female *An. maculipennis* var. *sacharovi* and *An. superpictus* in the aestivo-autumnal period" (p. 161). A. V. ULITCHEVA, "On the biology of *A. superpictus* in the river Agalyksai" (p. 170). M. T. BALASHEVA,

"On the development of Uzbekistan sandflies under laboratory conditions" (p. 202). A. I. SCHURENKOVA, "A simple technique for experimental breeding of sandflies" (p. 212). N. I. LAYTSHEV "An outbreak of unknown infection in Stalinabad in 1935" (p. 248). M. V. OSTROUMOVA, "On the biology of ticks of the genus *Ornithodoros*. The functional state of the sexual organs and the development of ova" (p. 270). E. I. SCHLEICHER, "Qualitative and quantitative analysis of the helminths from the large intestine of sheep in Middle Asia" (p. 286). N. I. KHODUKIN and B. N. RAKHINSKY "The fleas of gerbils from the valley of Fergana" (p. 299). A. I. LISOVA,

"Spines of certain plants as substitutes for entomological pins" (p. 302). M. Z. LITMAN "Complement fixation and agglutination reactions in intestinal diseases" (p. 304). J. P. VLASOV and N. I. KHODUKIN "On sandflies from burrows in the neighbourhood of

Ashkhabad (p 325) M S SORIEV On the characteristics of Middle Asia strains of tick fever spirochaetes (p 382) L. M. ISAJEV Spontaneous spirochaetosis in Uzbekistan dogs (p 377) N. KEVORKOV and E. SCHLEICHER The helminths of cats in Tashkent (p 433) N. I. KHODUKIN A review of the latest data on diseases of the typhus fever group (rickettsioses) (p 464)

The following papers dealing with leishmaniasis spirochaetoses and dysenteries of protozoal origin are of more general interest

A. S. KOVTUN Observations on Kala azar at the Kokand Station of tropical medicine (p 196) a description of cases of combined visceral and cutaneous leishmaniasis in children and of three cases of kala azar in children born in December and showing symptoms in March and April. These cases are interesting in view of the fact that in Kokand sandflies first make their appearance in April or May.

V. P. PETROV On the primary lesion in Kala Azar (p 222) an account of two cases of leishmaniasis in children in which visceral infection was preceded by cutaneous sores containing parasites.

A. R. FIALKOVSKY and O. A. TVERITINA Epidemiology of canine leishmaniasis in Tashkent 1934-1935 (p 349) there was an increase in the incidence of canine leishmaniasis probably due to improved registration in view of the epidemiological significance of dogs in human disease the destruction and/or treatment of infected dogs is advocated.

In another paper Kala Azar in Turkmenistan (p 458) the same author records the occurrence of cases of kala azar from the former Transcaspian Region of Turkestan where its presence was doubted.

Two papers are devoted to observations on the animal carriers of relapsing fever transmitted locally by *Ornithodoros papillipes* M. S. SOFIEV and D. L. OKHIRIMENKO On the reservoir of the virus of tick fever (p 180) strains were recovered from local rats (*Rattus rattus turkestanicus*) and inoculated into guineapigs and human beings (cases of G. P. I. and schizophrenia). As compared with human strains the rat strain was more virulent to guineapigs. In man this strain brought about more marked rises in the temperature curve and spirochaetes remained in the blood continuously up to 21 days without subsequent relapses.

M. N. KESHINIAN The rôle of the domestic rat *Rattus turkestanicus* as reservoir of tick fever in Tadzhikistan (p 257) the author established the presence of spirochaetes in 1-6 per cent of rats from human dwellings and regards this animal as the natural reservoir of tick fever in the country.

N. I. KHODUKIN and M. N. SOSHIKOVA Investigations on the reservoir of the virus of typhus fever in Tashkent (p 395) as the result of a series of observations and experiments the authors conclude that Tashkent does not represent an endemic focus of typhus fever the cases observed being due to introduction from outside. The infection is however endemic in local rats but the virus is weak. It was found that ticks (*Ornithodoros*) when fed on infected guineapigs retained the virus up to 54 days but were incapable of transmitting it through the bite.

N. A. CHAPURSKAJA BAGENOVA M. Z. LEITMAN and L. P. FIALKOVSKAJA Epidemiology of balantidiosis with a comparative study of *Balantidium coli* and *B. suis* (p 227) investigations conducted at a pig breeding farm revealed 6 infections with *Balantidium* among 44 workers, the infection rate in the pigs being



100 per cent. The insignificant incidence among human contacts indicates a low degree of susceptibility to the parasite. However the extremely rare occurrence of balantidiasis among the general population of Tashkent points to pigs as the source of human infection.

A. LYSURKINA, "On the treatment of amoebic liver abscess with Yatren" (p. 243) description of a case of amoebic liver abscess successfully treated with Yatren. C. A. Hoare

VAN THIEL (P) & SAUTET (J) Etude concernant l'existence des biotypes anthropophiles de l'*Anopheles maculipennis* [Feeding Proclivities of *A. maculipennis*.]—*Bull Soc Path Exot* 1937 Feb 10 Vol. 30 No. 2 pp 188-193

The authors describe experiments designed to explain the choice of host by mosquitoes of certain races of *Anopheles maculipennis*.

The apparatus made use of was that described by REUTER (see this *Bulletin* 1936 Vol. 33, p. 415). This consisted of two large cages separated by a small chamber. A man slept in one cage and a pig in the other, mosquitoes being liberated in the chamber between them so that they could pass towards either mammal at will. In the middle of the night the openings were closed and subsequently the mosquitoes in the two cages counted, a record being made of those which contain blood. The results of eight experiments are set out at length together with readings of temperature and humidity. The authors find it impossible to suggest any general explanation of their results. Sometimes a considerable preponderance of the mosquitoes (*clitus* and *labranchiae*) choose the one host at others the other; there appears to be no consistent relation to temperature or humidity. It would probably be justifiable to draw the general conclusion that the apparatus is a promising one, but that much more work must be done with it before results will be comprehensible. P. A. Buxton.

VAN THIEL (P) Quelles sont les excitations incitant l'*Anopheles maculipennis atroparvus* à visiter et à piquer l'homme ou le bétail? [What stimuli guide *A. maculipennis* in seeking food?]—*Bull Soc Path Exot* 1937 Feb. 10 Vol. 30 No. 2 pp 193-203

The author describes experiments designed to analyse the reactions of the female mosquito when seeking blood.

It will be remembered that REUTER (see this *Bulletin* 1936, Vol. 33, p. 415) made use of an "artificial arm" through which warm water could be circulated. Investigations on caged mosquitoes, when active at dusk, showed that the principal factor tending to make them attempt to bite was temperature. It was only when the apparatus approached blood heat that the insects moved towards it, but when they did so they showed a differential reaction, preferring a wet to a dry surface. Working with *A. maculipennis atroparvus* and a similar apparatus the present author finds that the attractive power of filter paper is not increased if it is made damp with sweat or with chemical substances which are present in sweat.

An observation was made that fresh dung is attractive to mosquitoes; this is not apparently due to odorous substances perceived by the human nose but to the fact that the dung gives off carbon dioxide. If this gas is released through the mouth of a tube projecting into a cage, mosquitoes of several species fly towards it; in most experiments,

but not in every one the number that did so exceeded those which moved towards a stream of air even if warm and moist. The observation is interesting and perhaps suggestive but it is difficult to accept the author's view that the insects are normally attracted to their host by carbon dioxide given off by the skin for he has not demonstrated or attempted to demonstrate that they are capable of perceiving the very low concentration of this gas which may be found at or near the surface of the body. The hypothesis that mosquitoes are led to enter a house or a stable because the concentration of  $\text{CO}_2$  may be higher in those places might not be difficult to prove or disprove but is apparently put forward without support. P A B

HACKETT (L W) Recent Additions to Our Knowledge of '*Anopheles maculipennis*' Races.—*Bull Health Organisation League of Nations*. 1937 Feb Vol 6 No 1 pp 1-16 [31 refs.]

(Before studying the present contribution to the racial question in *A. maculipennis* the reader should consult a previous paper on the same subject by the author [see this *Bulletin* 1935 Vol 32 p 138] and another by himself and MISSIROLI [*loc cit* p 809]) Reiterating his conviction that egg-characters still constitute the only known method of identifying individuals the author states that these have permitted the setting up of eight or nine distinct forms of which at least six are well established by biometric genetic and physiological tests as well as by field studies on their bionomic characters. In view of the vast range of *A. maculipennis* it is considered not unlikely that new local varieties will continue to be found. Experience shows that these should be described under the following headings: Eggs, larvae (with special reference to hairs nos. 1 and 2 on the second and fourth and fifth abdominal segments respectively), external harpaginal spine (in the male adult), bionomics (larval habitat) and habits.

With reference to the geographical distribution of races egg-surveys in regions not previously investigated have led to the following results: Sweden. The races found include *messeae typicus* and *atroparvus*. Yugoslavia. Forms met with were *messeae typicus elutus labbranchiae* and probably *subalpinus*. North Africa (Algeria, Tunis and Morocco). Only *labbranchiae* and the nearly allied form *sicaulti* are known to occur and the existence of *elutus* in the coastal region has not been confirmed. Syria. An unpublished report by KLIGLER (1935) mentions *elutus* as the only member of the *maculipennis* group this was discovered to be breeding in fresh water but no brackish water breeder was found. In the U.S.S.R. the latest actual survey is that by the present author and BARBER (1935) it would appear that only *messeae* and *typicus* are found in the interior while *elutus (sacharovi)* occurs on the Caspian and *atroparvus* on the Black Sea near Odessa.

It has been suggested by MISSIROLI (1935) that inconstancy of temperature is an important factor in larval ecology and may help to explain the distribution of the races and species.

According to DIEMER and VAN THIEL (1936) *A. maculipennis* in any one region consists fundamentally of only three races or biotypes. Thus North of the Alps we find *atroparvus messeae* and *typicus*. In the Iberian Peninsula *atroparvus subalpinus* and *typicus*. In Southern Italy *labbranchiae melanoon* and *typicus* and in the Balkans *elutus subalpinus* and *typicus*. It is asserted by the author that most of

the widespread anopheline species of the world have been found on examination to be complexes of this sort. As regards *A. maculipennis typicus* "Hackett & BARBER (1935) found a distinct type in the Caucasus with minute floats, and it is not unlikely that it will eventually be divided up into geographical sub-races.

Although in Western and Southern Europe most of the malaria for which *A. maculipennis* is responsible is carried by *atroparvus labranckias* and *clutus* in certain districts such as the Volga basin the region of the Danube above the delta and Central Yugoslavia the malady is undoubtedly due to *messens* or *typicus* or both possibly on account of a local deficiency of stabled domestic stock, which might otherwise form a barrier.

The mystery of *atroparvus* "a mild or even a virulent malaria-carrier in some regions, but harmless in others, is as yet far from being well understood

E. E. Austen

RICE (J. B.) & BARBER (M. A.) The Varieties of *Anopheles maculipennis* in a Region of Greek Macedonia.—*Bull. Entom. Res.* 1937 Oct Vol 28 Pt 3 pp 489-497

The authors publish a large number of observations made in Greek Macedonia in 1932-36 pointing out that what they have noticed may perhaps not be true for other countries, even for other parts of Greece. They confine themselves to two forms of *A. maculipennis typicus* and *messens sachseri (clutus)* is regarded as a separate species and excluded.

It will be remembered that *typicus* and *messens* are best distinguished by the eggs these may generally be separated even with a hand lens, by the black and white pattern of the upper surface, and at a higher magnification by the roughness of the floats. *typicus* shows transverse bands in the pattern and has rough floats. The present authors have examined 749 batches of eggs, each laid by a single female. Within each batch there is great uniformity but as is clearly shown by a table, the variation between batches is rather complex, even though only two characters are available for study. Making use of the surface pattern the authors recognized six groups (A to F) of which the first three conformed at least approximately to *typicus* the others to *messens*. Classifying their eggs in this way they found peaks in B and E but none of the other four patterns are very rare, even the least frequent representing 4 per cent. of the whole. If the eggs are classified into six categories by floats the results are essentially similar. It is clear from the table that there is a high degree of correlation between the two characters for instance, eggs which fell into the extreme *messens* group (F) by their pattern invariably had smooth floats but *messens* eggs which came rather near *typicus* in pattern (Group D) showed great diversity in floats.

It would be of great interest and perhaps of practical value if one could decide to what extent these differences are genetic and to what extent they are caused by factors in the environment but as it is impossible to secure pairing in captivity one cannot make much progress by breeding. The authors have, however, taken the matter a step further by isolating wild fertilized females securing their eggs and rearing from them female offspring. These will not pair but if they are given a blood meal they will sometimes lay sterile eggs. Working in this way 7 *typicus* adults and their 38 daughters were studied all

the daughters were identified as *typicus* by their eggs. The 46 daughters of 22 *messeae* parents were less consistent several of them laying eggs which had to be classified as *typicus*.

It has been observed in several parts of South Europe that there is a tendency for the type of egg to change as spring passes into summer. The authors have endeavoured to study this by taking individual females and causing them to lay successive batches of eggs while they were kept at different temperatures. They found that an individual female will lay paler eggs after being kept at a higher temperature than she did at a low temperature but they have not obtained such great changes in egg type as other workers have recorded elsewhere.

Both *typicus* and *messeae* were found infected with sporozoites in nature but the event is so rare that the authors cannot satisfy themselves as to the relative importance of the two. They found no significant difference between the races choice of house or stable as a resting place.

P A B

ROUBAUD (E.) & TREILLARD (M) Observations biologiques sur le biotype *cambournaci* de l'*Anopheles maculipennis* [The Biology of the *cambournaci* Biotype of *Anopheles maculipennis*].—*Bull Soc Path Exot* 1937 May 12. Vol 30 No 5 pp 383-387

The Portuguese variety of *A. maculipennis* described by the authors in 1936 as *cambournaci* is distinguished morphologically from var *atroparvus* to which it is nearly allied by the peculiar smallness of the egg floats. Subsequently specimens of the new variety or biotype were collected by Treillard in S France (Camargue) and both Portuguese and French stocks have been bred experimentally for several generations and closely compared one with another and with *atroparvus*. In the Portuguese and French stocks of the var *cambournaci* the biological characters observed are absolutely identical showing a certain differentiation in this respect from the var *atroparvus* and confirming the validity of the distinction based on the egg characters.

Although *atroparvus* breeds freely in a confined space it is exceptional for this mosquito to mate in cages of small dimensions and in the laboratory a container measuring one-twentieth of a cubic metre is the smallest in which it is usually possible to obtain the fertilisation of females followed by the deposition of batches of fertile eggs. In the present paper details are given of three breeding experiments—one with *atroparvus* from Vendée, one with a single female and a single male of Portuguese *cambournaci* and a third with three females and a solitary male of *cambournaci* from Camargue—in small netting cages measuring 14 cm. × 7.5 cm. × 4 cm. It was found that in spaces so limited the mating of the *cambournaci* biotype whether from Camargue or Portugal regularly and readily occurred while in similar conditions it took place only exceptionally in the case of Vendéan *atroparvus*. Thus the biotype *cambournaci* would seem at present to be the most strictly stenogamous of all the varieties or races of *A. maculipennis* and is perhaps the easiest to keep in European laboratories.

A further series of experiments showed that *A. cambournaci* is a more active biological type than *atroparvus*. At the same season of hibernation and in the same rearing conditions the authors compared the

winter behaviour of the stock of *atroperrus* from Vendée and that of the two *cambourmari* stocks. It was found that in identical conditions of food-supply and temperature females of the *cambourmari* biotype, subjected in winter to continuous warmth become fertile more quickly than do those of *atroperrus*. In the case of the latter in females of different ages selected at hazard there was the trace of a winter sexual diapause partly interrupted by the artificial action of heat. In the experiments with females of the biotype *cambourmari* no comparable lag in the advent of reproductive maturity was seen and individuals as a whole reached the breeding condition sooner than did the representatives of *atroperrus*. It is to be inferred that in nature the hibernation of *cambourmari* represents a principal mode of overwintering brought about by the lowering of the temperature and liable to yield quickly to the application of heat. It does not correspond to the phenomenon of spontaneous ovarian blocking characteristic of the true hibernating females of *atroperrus* the reactivation of the latter in natural conditions at the commencement of their winter life is always more or less difficult.

The physiological differences thus displayed by the two biotypes under consideration would justify their being regarded as distinct, even though such interpretation were not based on morphological differences in the egg, verified in successive generations. E E A

ROZEBOOM (L. E.) On *Anopheles albisternis* Lynch Arribalzaga in Panama.  
—*Southern Med J* 1937 Sept Vol 30. No 9 pp 830-831  
With 3 figs

MAJID (Syed Abdul) An Improved Technique for marking and catching Mosquitoes.—*Records of the Malaria Survey of India*  
1937 Mar Vol 7 No 1 pp 103-107 With 1 fig & 1 plate

The paper describes a method by which a simple pump may be constructed with which to apply a distinctive dust or powder to live mosquitoes. It is found that a convenient powder to use is what is sold as gold powder used for decorative writing. This is inert, not sticky and easy to recognize.

The author also describes an ingenious apparatus for catching mosquitoes at rest. It consists of three tubes inserted in a rubber bung the details being figured. In using it one sucks air through the first tube the mosquito being sucked up the second and drawn into the third, which is an ordinary test tube and removable from the bung.

P A B

JACK (Rupert W.) JACKSON (C. H. N.) MELLANBY (Kenneth)  
Water and Fat Content of Tsetse Flies. [Correspondence]—  
*Nature* 1937 Jan. 2. Vol. 139 No 3505 p 31 Apr 17  
No 3520 pp. 674-675 May 22. No 3525. p 883.

Some progress in understanding the effect of atmospheric humidity from insects has been made by the admittedly crude method of exposing insects to particular conditions, weighing them and again

weighing them after they have been dried to constant weight. From these figures the proportion of water in the insect as a whole is calculated.

In the present correspondence Jack and also Jackson put forward the view that it is for many purposes better to calculate the proportion of water after deducting the amount of fat in the insect's body. They point out that fat is more or less inert and that its exclusion from the calculation may be held to give a truer picture of the state of the insect.

Mellanby is doubtful whether it is worth while to take the weight of the fat when calculating the proportion of water. He points out that there are many structures and substances in the insect such as skeleton and gut contents all of which ought to be subtracted to obtain the sort of result which Jack Jackson and others would like to see. Moreover the quantity of circulating blood varies enormously with the state of the insect. One may sometimes dissect a tsetse fly and find the tissues supplied with a large quantity of blood while at other times very little is there. But the tissues themselves appear to be adequately supplied with water in both cases. He takes the view therefore that as it is highly desirable to know more about the effect of climatic conditions on the living parts of insects we must go much further into the matter and by proper development of technique obtain information about the weight of living tissues. *P A B*

MARSHALL (J F) & STALEY (J) Some Notes regarding the Morphological and Biological Differentiation of *Culex pipiens* Linnaeus and *Culex molestus* Forskål (Diptera, Culicidae).—Reprinted from *Proc Roy Entom Soc London* Ser A. General Entomology 1937 Feb 15 Vol. 12. Parts 1-2. pp 17-26 With 2 figs [17 refs.]

The authors call attention to the curious discrepancies that have been observed in the habits of *Culex pipiens* in different parts of Europe in some places it attacks man in others not at all or only rarely. The distinction was observed as long ago as 1890 by FICALBI who also pointed out certain anatomical differences between the two types of insect. The matter continued to receive much attention particularly after 1929 when several authors independently discovered a type of *C. pipiens* which was able to mate in small cages and to lay eggs without taking a meal of blood.

The present authors have studied several strains of both types of mosquito and show in a table the points of difference both in larvae and in adults. They find that several of the characters which have been used are not reliable when material from different parts of Europe is compared and give full details about the inconsistencies between one strain and another. The table shows the mean values of the siphonal index and the number of branches of the tufts on the siphon—it would perhaps be of still greater value if more information had been printed about the scatter about the mean.

The view is put forward that it would be less confusing if the two types of *Culex* were regarded as different species. The authors give grounds for believing that *Culex pipiens* of Linnaeus is dark, with spots on the ventral surface of the abdomen, and that it does not take the blood of man. The other species readily bites man but will lay eggs without a blood feed—it seems that the correct name is *C. molestus* (Forskål 1775). *P A B*

GALLIARD (Henri) Ponte et évolution larvaire de *Ansonia indiana* et *Ansonia annulipes* dans le delta du Tonkin. [Egg Laying and Larval Life History of *Ansonia indiana* and *Ansonia annulipes* in the Delta of Tonking.]—*C R Soc Biol.* 1937 Vol. 125 No 19 pp 491-492.

The breeding habits of *Ansonia* are of some practical importance because certain members of this genus are proved or suspected carriers of *Filaria bancrofti* and *malayi*.

In most parts of the tropics mosquitoes of the genus *Ansonia* are particularly associated with the plant *Pistia* the female laying her eggs on the underside of the leaf and the larva and pupa tapping the internal atmosphere which is found in the body of the plant. But in the delta of the Red River in Tonking the plant to which the larvae and pupae are found attached is nearly always *Pontederia* (*Eichornia*) even though *Pistia* is abundant and found close to the villages. But the female mosquito never lays her eggs on the leaf of *Pontederia* either in nature or captivity and it seems that in nature she generally chooses the floating water fern *Salvinia* P A B

DE MEILLON (Botha) & GRAY (F. C.) The Control of a Species of *Chironomus* Meigen (Dipt. Chironomidae) in an Artificial Lake by increasing the Salinity.—*South African Med J.* 1937 Sept 25 Vol. 11 No 18. pp 658-660 With 1 chart.

A hollow in the ground near Port Elizabeth was used as a dam to supply water to a power station and water was diverted into it. The conditions became exceedingly favourable to the breeding of *Chironomus* of an unidentified species. The adult gnats not in themselves harmful occurred in such great numbers as to be an intolerable annoyance to dwellers near the dam who were compelled to shut their doors and windows at night owing to the great abundance of the insects work was stopped in a printing press.

The breeding of the insects was controlled by pumping sea water into the dam and it was found that about 3 per cent salinity was necessary. P A B

SCHWITZ (J.) Notes étiologiques sur les phlébotomes du Bas-Congo [Etiological Notes on the Phlebotomus of the Lower Congo].—*C R Soc Biol* 1937 Vol. 124 No 10 pp 1015-1017

In Belgian Congo at any rate in certain regions, several species of *Phlebotomus* are much commoner than has hitherto been supposed, but of these only one (*Ph. schwartzi*) is definitely known to suck human blood. The author has met with *Phlebotomus* whether in native villages or European settlements, only where there are cesspits. In these places usually without water-flushing and either roofed or open to the sky the insects are sometimes very numerous, biting at all times of the day and night although likewise found in native huts and even in European dwellings. The fondness of *Phlebotomus* for latrines and their characteristic odour is difficult to understand, since the insects do not breed in faecal matter. As to their pathogenic rôle if any nothing is yet known. E E A

RAYNAL (J) Contribution à l'étude des phlébotomes d'Indochine III Distribution géographique des phlébotomes de l'Indochine Nord. Quelques aspects de leur biologie [Geographical Distribution of the *Phlebotomus* of Northern Indo-China, and Certain Aspects of their Biology]—*Arch Inst Pasteur d'Indochine* 1936 Apr Vol 6 No 23 pp 349-374 With 5 maps & 17 figs on 5 plates. [40 refs.]

Based on the author's investigations in Northern Indo-China in 1934-35 the following conclusions emerge from the papers whereof the present forms the final chapter

In the region dealt with *Phlebotomus* appears scarcely to occur in the deltaic and maritime zones of Tonking and Annam. It is met with especially among the rounded hills which form the transition to the mountainous regions but in the highlands it also occurs in certain valleys at altitudes of from 1,200 to 1,600 metres. Up to the present between the 15th and 25th parallels of north latitude the following ten species have been met with *Ph stantoni*, *Ph baylii* var *campester*, *Ph barraudi*, *Ph sylvestris*, *Ph syngari*, *Ph argentipes*, *Ph hibernus*, *Ph silaticus*, *Ph morini* and *Ph tonkinensis*. Of these the first six were already known to occur in neighbouring countries especially India; the other four are new. With the exception of *Ph barraudi* which alone exists at altitudes of 1,200 and 1,600 metres all these species have been found exclusively in the lowlands at from 30 to 150 metres above sea level. *Ph stantoni* which seems to disappear during certain months of winter is a northern species while *Ph baylii* var *campester* is a more southern form occurring more constantly throughout the year and its area of distribution would seem to extend well to the south of the 15th parallel.

*Ph silaticus*, *Ph syngari* and *Ph hibernus* are wild species, but the majority of the others appear to be semi-domestic in habit sheltering among the surroundings of human habitations and in the vicinity of small domestic animals in the latter case whether this is in order to obtain food or simply for the sake of shelter is difficult to say. *Ph barraudi* found in the immediate proximity of man has by the precipitin test been shown to be capable of imbibing human blood but for the rest leaving out of account those captured in inadequate numbers numerous facts seem to negative all idea of their feeding at the expense of man. It is probable that further species and localities wherein *Phlebotomus* occurs have still to be found. The presence of *Ph argentipes* in Indo-China is vouched for by the finding of a solitary example in Central Annam and the insect is likely to exist in the south. The demonstration of the occurrence of this species in a region free from Indian kala azar might be the starting point of interesting observations and discoveries. E E A

THOMSEN (Ellen) & THOMSEN (Mathias) Ueber das Thermopräferendum der Larven einiger Fliegenarten. [The "Preferred Temperature" of the Larvae of Certain Sorts of Flies.]—Reprinted from *Ztschr f vergleichende Physiologie* 1937 May 18. Vol. 24 No 3 pp 343-380 With 19 figs. [23 refs.]

The purpose of the authors is to define the reactions to temperature of larvae of house-flies (*Musca*) and of related species.

The authors used a long trough one end of which was heated and the other cooled so as to set up a temperature gradient. In this trough



they put dung of horse or other animal and the larvae under experiment. By an ingenious device they overcame the tendency of the dung to become dry at the hotter end of the apparatus. They reared their insects at 25°C. and introduced batches of larvae into the apparatus, observing the temperature at which the larvae congregated and finding that for larvae of a particular age there was great consistency. For the first half of larval life *Musca domestica* congregates at the surprisingly high temperature of 30-37°C. Later but before it begins to migrate away from the food the preferred temperature falls and when the prepupal stage is reached the preferred temperature is below 15°C.

It is interesting to compare the temperature chosen by *Musca* and by other larvae. The larva of *Haematobia stimulans* which breeds in cow pats in the open and mostly in spring and autumn chooses 19-23°C corresponding with low temperatures which prevail in its normal environment. But the *Lyperosia irritans* larva which breeds in cow-pats in high summer has (perhaps for that reason) a higher preference about 27-33°C.

The authors view is that choice of temperature is one of the things which influences the larva's behaviour in nature. They give a short discussion of other factors such as light and moisture. P A B

PARKER (J. R.) Intoxication par l'arsenic chez l'homme et les animaux à la suite des campagnes de destruction des sauterelles. [Poisoning of Man and Animals from the Use of Arsenic in destroying Grasshoppers.]—*Bull. Office Internat. d'Hyg. Publique* 1937 May Vol. 29 No. 5 pp. 968-971.

GAUD (M.) Méthodes employées au Maroc pour la destruction des sauterelles et accidents causés au bétail et à l'homme par l'emploi des produits toxiques.—*Ibid.* pp. 977-991. With 2 maps.

The two papers deal with the possible danger to man or domestic animals that arises from the use of arsenical compounds for destroying grasshoppers and locusts. It will be remembered that very large quantities of sodium arsenite and other salts of arsenic are used in certain areas and that the making of poisoned baits and their distribution is to a great extent in the hands of uneducated farm labourers in many parts of the world. Moreover as the bait usually consists of bran molasses and arsenic it is a substance which cows, sheep, etc. are glad to eat.

The authors point out that where the directions are properly followed, cases of poisoning of cattle are rare and that no damage occurs to human beings. Where deaths of farm animals have been investigated they have been due to gross carelessness or occasionally to deliberate poisoning. When it is properly distributed poisoned bait is scattered so thinly that it is impossible for a grazing animal to absorb a harmful dose of it. The men who have to mix the material or distribute it should be careful to wash their hands afterwards, giving particular attention to cleaning beneath the nails. It need hardly be added that boxes, sacks, etc. which have contained arsenic must be kept under lock and key and destroyed by burning as soon as possible.

The second author records that analyses have been made of the water in shallow pools close to areas over which the bait had been distributed. Arsenic was not found to be present in the water.

Several other short papers in the same issue of this periodical confirm the general conclusion. It is widely known among agricultural entomologists that the use of arsenic on a grand scale does not cause fatalities provided reasonable care is shown.] P A B

- i. ASHMORE (S A) & HUGHES (A W McKenny) Use of Certain Coal-Tar Naphtha Distillates for the Destruction of Bed-Bugs.—*Lancet* 1937 Feb 27 p 530
- ii. HOLBORN (J M) Eradication of Bed-Bugs [Correspondence]—*Ibid* May 1 pp 1074-1075
- iii. MELLANBY (Kenneth) Methods of destroying Bed-Bugs [Correspondence.]—*Ibid* June 5 p 1372.
- iv. ASHMORE (S A.) & HUGHES (A W McKenny) Methods of destroying Bed-Bugs. [Correspondence.]—*Ibid* June 12 pp 1434-1435 [Summaries appear also in *Bulletin of Hygiene*]

i. The authors report successful fumigation of houses infested with bed bugs by using group of coal tar distillates known as naphtha.

It appears that the method is not yet fully worked out but that it is very promising. The liquid of which an approximate specification is published has a distillation range of 160°-190 C. It doubtless contains a very large number of different chemical substances which have not been identified and it is not known which of them possess the insecticidal properties. The vapour of this liquid kills bugs the lethal concentration not being known but the authors custom being to use one gallon for 750 cubic feet with an exposure of 18 to 24 hours. The liquid is applied with a spray. The effect is much greater at higher temperatures and it is recommended that rooms should be heated at least to a temperature above 60 F before the fumigation is commenced. The method has been used in about 200 houses and flats successfully in the great majority of instances. The reader assumes that a single fumigation is sufficient though that is not stated.

It has been shown that the vapour of this distillate is not toxic to experimental mammals though operators require to wear a mask for comfort. The vapour clears quickly from a room when it is opened up. Needless to say it is inflammable.

ii. The correspondent discusses the good and bad points of this fumigant. He has experimented with it in small vessels in the laboratory at a concentration corresponding to one gallon in 750 cubic feet and finds that bugs frequently recover after experiments up to six hours. Eggs are more resistant than larvae or adults. He points out that there is a danger that some samples of this very roughly identified material may contain mesitylene which is known to be toxic to man and emphasizes the risk of fire and possibility of explosion from static electricity.

The conclusion is reached that the material is in many ways far from ideal. The view is put forward that the ordinary householder might make much more use than he does of proprietary contact insecticides applied with a small vaporizer worked by hand. In this way minor infestations at least might be dealt with with very little trouble or expense.

iii. A second correspondent calls attention to another simple useful remedy. He finds that ordinary methylated spirit 30 parts with water 70 parts runs well into cracks and is fatal to larval or adult bugs if they become wetted with it. Many but not all eggs are

killed. The liquid is not inflammable nor harmful to bedding or furniture. The method is recommended as a minor one which the householder can employ.

iv. The original authors dissent from some of Mr Holborn's views. They hold that danger to man from mesitylene "is not to be apprehended." Even if vapour leaked into an adjoining room where there was a naked light the danger of fire is very little. They have modified the original technique and now spray the naphtha upon a blanket which is suspended close to the wall, tending to increase the concentration near the spot where the bugs live. They agree that simple methods which the housewife can use have value when the infestation is a small one.

P A B

JOHNSON (C. G.) The Relative Values of Man, Mouse, and Domestic Fowl as Experimental Hosts for the Bed-Bug, *Cimex lectularius* L.—*Proc. Zool Soc London Ser A* 1937 Pt 1 pp. 107-128 [16 refs.]

It has been known for many years that bed-bugs (*Cimex lectularius* and *rotundatus*) feed readily in the laboratory and in nature on many sorts of birds and mammals. It is the author's purpose to provide precise quantitative facts about the life-history of bugs bred on different hosts. There are two possible ways of obtaining this information—by rearing the insects on different hosts under precisely determined standard conditions or by keeping bed bugs and host in association for long periods under conditions resembling those which occur in nature. In the present paper the author sets out results obtained by the first method only.

*Cimex lectularius* has been reared on man, mouse and fowl. In order to compare the efficiency of these hosts the author selected seven particulars, each capable of being expressed numerically. Among them are the fertility of the adult, the weight of blood taken at a meal (adult and larva), the fresh and dry weight of the insects, etc. On these points the paper contains a very large body of fact collected with great care and tabulated and considered thoroughly. The data are submitted to appropriate statistical analysis. From the work the fact emerges that the bug will not only feed on several hosts, but go successfully through the life cycle and lay eggs on all of them. There is however a definite tendency for the mouse to be better as a host than man or fowl. On the mouse the speed of development at constant temperature is slightly greater, the mortality less and the adults heavier so that they lay more eggs following a single meal of blood. All these differences are probably due to the fact that on the mouse insects take a rather greater meal of blood than on other animals. But the mouse is not in every respect the host on which the insect lives most successfully for bugs which have been fed on man and then starved live longer than those fed on mouse. Though the hosts differ from one another and though many of the differences are statistically significant it would be broadly true to say that on all of them the insects were able to live and breed successfully. The author's own summary states that "The differences in the life of bed bugs living on different hosts—man, mouse, and fowl—in nature are more likely to be due, primarily, to differences in the behaviour of the insects in the presence of those hosts rather than to the physical

effects of the meals taken from them. It is curious and interesting that in certain respects significant differences were found between bugs fed on two different individual men.  
P A B

LADELL (W R S) A New Apparatus for separating Insects and Other Arthropods from the Soil.—Reprinted from *Ann Applied Biol* 1936 Nov Vol 23 No 4 pp 862-879 With 2 figs & 1 plate. [20 refs.]

The paper describes an apparatus which will separate insects including very minute ones from a considerable sample of soil. It appears to be much more efficient than anything which has been previously used.

The general method is that the sample of soil is broken up in a dense liquid a saturated solution of magnesium sulphate being applied in this the soil is stirred by a stream of air the animals being brought up in a froth and eventually delivered on the surface of black filter paper. The apparatus is described and figured in full (it is understood that it will shortly be put on the market by a firm of instrument makers). With this apparatus it is possible to deal with seven pounds of soil in half an hour concentrating the insects etc. most of which are alive in a very small volume almost free of soil particles. The efficiency of the method may be judged from the fact that it revealed a population of 120 million insects principally small Arthropods per acre of new grassland in south-east England.

The apparatus is mentioned here because it may be of great service in mapping the exact distribution of early stages of *Phlebotomus* or *Culicoides*.  
P A B

PARKER (R. R.) PHILIP (Cornelius B.) DAVIS (Gordon E.) & COOLEY (R. A.) Ticks of the United States in Relation to Disease in Man.—*Jl Econom Entom* 1937 Feb Vol 30 No 1 pp 51-69 [52 refs.]

The paper is a useful summary of which the scope is indicated by the title. It appears that no less than five diseases are transmitted by ticks (though not exclusively by ticks) in the U.S.A. Rocky Mountain spotted fever tularaemia, relapsing fever Colorado tick fever (of unknown cause but apparently a distinct entity) and tick paralysis. Reference is also made to the exanthematous fever of the Mediterranean which has not yet been recorded in the country.

P A B

PARKHURST (Howard J.) Trombidiosis (Infestation with Chiggers) — *Arch Dermat & Syph* 1937 June Vol 35 No 6 pp 1011-1034 With 6 figs. [62 refs.]

The paper which was read at a congress of dermatologists gives a general account of infestation by the animal which is called a harvester in this country special attention being given to pathology treatment and other matters likely to appeal to a medical audience.

The paper opens with a general account of existing knowledge about the geographical distribution of the Trombididae (some of which is hardly relevant for it seems to be assumed that all members of this family attack man when in the larval stage). The author then passes

to the life-history so far as it is known with particular reference to *Trombicula irritans* in North America also the method by which man is attacked. The actual point of attack is frequently just within the mouth of a sweat duct or hair follicle here the mite anchors itself and pours out a digestive ferment which attacks and liquefies the epidermis, the result of this digestive activity being then swallowed. The author then gives a precise description of the lesion on the skin, illustrated with microphotographs. The stages through which the lesion develops are defined as "spastic ischemia, exudative arteriolitis vasolysis with hemorrhage and vesiculation followed by primary resorption and terminal repair."

For exterminating the mites when they are on the person the application of benzene or kerosene followed by a prolonged bath is suggested. In order to allay the irritation a brief application of alcohol should be followed by the use of a boric acid ointment containing one or two per cent of phenol.

The paper concludes with a valuable list of 62 references of papers published since the subject was reviewed by TOOMEY in 1921. Certain minor errors in the non-medical part of the paper might perhaps have been avoided if the manuscript had been read by a zoologist and by someone fully informed about modern work on tropical typhus.

P A B

EVANS (A M) & LEECH (H S) Notes on Variation in *Anopheles rivulorum* Leeson in East Africa, with Description of a New Variety — *Ann Trop Med & Parasit* 1937 Oct 22 Vol 31 No 3. pp 383-398 With 1 fig

MACFIE (J W S) Notes on Ceratopogonidae (Diptera) — Reprinted from *Proc Roy Entom Soc London Ser B Taxonomy* 1937 June 15 Vol 6 Pt 6 pp 111-118

Contains a key of species of *Culicoides* found in Malaya and neighbouring countries

DE BERGARDI (Bartolomé) Contribución al estudio de la parasitosis intestinal en la población infantil y adulta de la ciudad de Paraná (E R) [Intestinal Parasitism among Inhabitants of Paraná: *9a Reunión Soc Argentina Patol. Regional* *Vendozas* 1: 3, octubre 1935 Vol 2 pp 1305-1328. With 6 figs.

The population of the town of Paraná is not stated but the authors examined the faeces of 1789 persons, 1445 adults and 344 children. No deductions of value can be drawn from so small a number of children suffice it to say that parasitism is, judging by the results in these cases, very high 80.2 per cent were infested 77.1 were passing protozoa and 18.3 per cent helminthic ova and often more than one kind. In spite of this, the children generally seem to be healthy although 38.3 per cent passed *Giardia*, and 23.5 per cent *E. histolytica*. The commonest helminthic infestation was *Enterobius*, in 9 per cent. hookworm in 1.1 per cent only.

Of the 1445 adults 1177 harboured parasites (81.4 per cent.) 536 had one only 651 had two or more. In them, as in the children, protozoa predominated of those with one only 490 were protozoal and 36 helminthic. Among the adults *Enterobius* was the commonest

helminthic parasite (5.3 per cent) *Taenia saginata* next (1.5) hook worm only 4 (0.26 per cent) *E. histolytica* was found in 28.7 per cent. *Giardia* in 14.5 per cent  
H H S

CICCHITTO (Angelo M.) I primi casi di balantidiosi in Somalia. Nota preventiva. [First Cases of Balantidiosis recorded in Italian Somaliland.]—*Arch Ital Sci Med Colon e Parassit* 1937 Feb Vol. 18 No 2. pp 118-119

A shepherd aged 36 suffered from diarrhoea 10-12 actions daily with mucus and blood and accompanied by tenesmus and pain in the iliac fossae and along the colon. Examination of the stools revealed *Balantidium coli* and three others of the patient's family were also found infested. They lived in the same house and followed the same occupation. These are claimed to be the first record of this infestation in Italian Somaliland.  
H H S

GIROLAMI (Mario) Un caso di balantidiosi osservato in Somalia [A Case of Balantidiosis seen in Somalia.]—*Arch Ital Sci Med Colon e Parassit* 1937 Feb Vol. 18 No 2. pp 120-124

The same claim of being the first case of balantidiosis is made for this author's patient a soldier of 25 years born in Agrigento but sent to serve in Chisumale Somalia in April 1935. He remained well until April 1936 when he suffered from diarrhoea and was admitted to hospital with a diagnosis of entero-colitis probably amoebic. Examination discovered *Balantidium* but not *Entamoeba*. [No dates are given in the preceding paper so it is not possible to say which has the priority.]  
H H S

KIKUTH (Walter) Chemotherapeutische Versuche mit Sdt. 386 B einer Arseno-Stibio-Verbindung [Chemotherapeutic Trials with Sdt. 386 B, an Arsenic-Antimony Compound.]—*Arch f Schiffs u Trop Hyg* 1937 Dec. Vol. 41 No 12. pp 729-735 [26 refs.]

The high chemotherapeutic index of two arsenic-antimony compounds Sdt. 283 and Sdt. 246 synthesized by SCHMIDT in the treatment of experimental bartonella anaemia of rats stimulated a search for newer and even more active compounds. This resulted in the production of preparation Sdt. 386 B whose surprising activity has been mentioned previously [See this *Bulletin* 1935 Vol. 32 p 227]

Sdt. 386 B containing 18 per cent arsenic and 20 per cent. antimony is a brown powder readily soluble in water. Large doses produce neither symptoms of acute arsenic nor of acute antimony poisoning. The lethal subcutaneous dose for rats is 750 mgm./kgm. bodyweight and the well tolerated dose 500 mgm./kgm. In heavy bartonella infections 0.2 mgm./kgm. is active and 0.1 mgm./kgm. has some action in most cases. In other words the chemotherapeutic index is from 1,250 to 1,500 which is something extraordinary such an index being hitherto unknown in therapy.

In experimental infections the drug exerted some action on trypanosomes on rabbit syphilis, on fowl spirochaetosis and on the spirillum of rat bite fever. It was inactive against leishmania, but the strains used were also uninfluenced by all other antimony compounds. Positive results were obtained in the treatment of mice infected with

*Schistosoma mansoni* and of cats infected with *Opisthorchis felinus*. Some results were also obtained in rickettsial infections of guinea-pigs and streptococcal infections of mice.

This extraordinarily widespread activity suggested that the therapeutic effects depended not on specific action but on stimulation or mobilisation of the defence forces of the body; but this hypothesis had to be abandoned since no such stimulation effect was seen when the preparation was used in conjunction with specific drugs against bird malaria, haemoproteus infections, dog piroplasmosis, rat leprosy and canary pox.

These results and the exceptional activity of the compound in rat bartonella anaemia led to its clinical trial in diseases of man and animals. In animals despite the author's expectations, it was inactive in anaplasmosis.

Various workers reported that in man it was efficacious in leishmaniasis of the skin and especially of the mucous membrane in lymphogranuloma inguinale in intermittent malarial fever in Bang's disease and in clonorhizis. In early although not in later cases of Gambian sleeping sickness it worked well, but in general it was inferior to Bayer 205 (see this *Bulletin* 1896, Vol. 33 p. 170). Very small doses (0.2 gm.) were used however from which results could hardly be expected. It produced some disappearance of ulceration in leprosy.

The most noteworthy results were those obtained by MAXIMOW in 14 severe cases of Oroya fever, a disease of very high mortality for which hitherto there was nothing more than symptomatic treatment. Doses of 0.1 to 0.3 gm. Sdt. 386 B repeated two or three times brought about the disappearance of bartonella from the circulating blood and initiated an increase in the erythrocyte count and a rapid improvement in the general condition. The earlier the treatment was started the greater was the prospect of a rapid and permanent cure. In some cases a total of 5.7 gm. was tolerated without untoward effect on the secondary stage of the disease; the drug acted favourably on the skin eruption although a primary action on the cell inclusions could not be demonstrated after treatment; the nodules became small shrunken and old in appearance.

The drug appears then to have a specific action on Oroya fever as marked as on experimental bartonellosis of rats and a practical superiority over other antimony and arsenic compounds which justifies further trial.

CAMERON (Thomas W. M.) The Internal Parasites of Man in Eastern Canada.—Reprinted from *Med. Log.* Vol. 2 No. 1 pp. 50-63. With 4 figs.

LEE (Douglas H. K.) The Settlement of Tropical Australia.—*Med. Jl. Australia.* 1896 Nov. 21 23rd Year Vol. 2 No. 21 pp. 707-712.

In this general article the author comments on the economic, social, physiological and medical aspects of the problem of settlement in the tropical areas of Australia. After reviewing the evidence collected in various investigations and the opinions expressed by many authorities he broadly outlines a scheme for future progress through the application of physiological knowledge and methods of research to the problems of life and work in tropical climates.

G. P. Crowder

ZIEMANN (Hans) Vom Problem der Akklimatisation der weissen Rasse in den Tropen.—*Deut Med Week* 1937 Apr 23 Vol. 63 No 17 pp 666-672 [17 refs]

BOHRD (Milton G) Keloids and Sexual Selection. A Study in the Racial Distribution of Disease—*Arch Dermat & Syph* 1937 July Vol. 36 No 1 pp, 19-25 [30 refs]

That keloids are more common among negroes than among white persons is as the author says common knowledge. The ratio is variously estimated in America as 19 : 14 : 1 and 9 : 1. He would explain the difference thus—

A tendency to keloid formation is present in some persons and this tendency is hereditarily transmitted. However the idea may have started it came to be believed that there was a close magical association between the presence of cicatrizations and fertility. It may be that the first keloids were the unpremeditated results of cutaneous injuries or diseases but later they were artificially produced by incisions into the skin. Other well established principles of the magic art caused the choice of puberty as the time for making the incisions and sexually important areas as the sites for the designs.

The persons with the best designs designs which stood out boldly from the surrounding skin mated early and left the largest number of progeny, these in turn also possessed the tendency for excessive connective tissue growth. As the proportion of these scarred persons within a tribe became larger and the magic virtue of keloids became more firmly established the persons without the ability to produce these scars found it difficult or even impossible to acquire mates. In time the members of the tribe were practically all descendants of those who possessed the tendency to keloid formation.

The process described is in every essential that called by Darwin sexual selection  
A G Bagshawe

BARRETT (R. E.) A Portable Steam Disinfector—*East African Med J* 1937 July Vol. 14 No 4 pp 132-134 [Summary appears also in *Bulletin of Hygiene*]

A steam disinfector is described which was designed primarily for dealing with the problem of louse infestation in native institutions such as jails asylums and hospitals. The apparatus is made throughout of sheet steel of not less than 20 gauge. The disinfecting chamber is a cone narrow at the top wide at the base. The base is welded by means of a steam-tight joint to a cylindrical boiler of similar diameter to the base of the cone. The boiler chamber is separated from the disinfecting chamber by a metal plate perforated with  $\frac{1}{4}$ -inch holes. Handles are provided for lifting the apparatus and the top aperture of the cone is fitted with a rimless lid which slightly overlaps. The apparatus is stood on a detachable metal stand 12 inches high beneath which a fire or 4-burner stove is placed. The dimensions are top diameter of cone 12 inches base diameter of cone 24 inches height of cone 36 inches height of boiler 7 inches. The cost of construction by a Kampala tinsmith was 50s. The apparatus is capable of dealing with about 12 blankets or 25 complete prison suits at a time.  
C C Okell



# MEDICAL AND SANITARY REPORTS

## SIERRA LEONE (1936)

The Colony and Protectorate of Sierra Leone has an area of nearly 28,000 sq miles, a little less than that of Scotland. The sea coast is 210 miles long and extends from Kiangba on the border of French Guinea to the Mano River on the Border of the Republic of Liberia.

*Vital Statistics*—Year by year the Registrar-General continues to extend the system of registration (see this *Bulletin* 1936 Supp., p 25\* and 1937 Supp. p 29\*) in the Colony and Protectorate. There are now in addition to the Chief Registrar Deputy Registrar and Chief Registrar's Clerk 27 Registrars (chosen from Medical Officers and educated but non-medical citizens) and 23 Deputy Registrars (these posts being filled by dispensers and educated citizens). It is again pointed out that at present figures cannot be regarded as a true assessment of the state of the public health. For Freetown alone where control is rigid and registration reasonably complete the data are dependable also a crude estimate of the mid year population is possible in the case of Freetown only other population figures repeating the facts obtained during the Census of 1931. The relevant data read as follows—

Area	Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I M R.
The Colony	103,378	2,537	24.5	2,490	24.0	584	230
Freetown	62,314	1,437	23.0	1,297	20.8	303	210
The Protectorate	1,672,058	2,453	?	733	?	146	?

The above facts are supplied by the Chief Registrar an appointment held *ex officio* by Dr J A A DUNCAN M.C., Assistant Director of Medical Services (Health) who wisely observes of registration efforts in Sierra Leone "The machinery exists and only time and custom will induce the African to register and this object is better obtained by persuasion than coercion." Dr Duncan and his subordinates are to be congratulated on the success which is attending their interesting endeavours in this important branch of public health work.

*European Officials* resident numbered 211 with an average number resident of 145. No deaths occurred but 16 invalidings were recorded, 2 due to *neurasthenia* the remainder to 14 different causes. *European non-officials* resident were 504 with an average number resident of 358. Of these 21 were invalided and 4 died. Only one invaliding and one death could be directly attributed to tropical diseases.

There were 960 *African Officials* resident with an average number resident of 830. Two deaths and 11 invalidings occurred none attributable to tropical diseases.

The average strength of *African Troops* (R.W.A.F.F.) was 369. One death occurred and during the year 275 men were on the sick list. The total strength of *African Police* was 266. Four died and 174 were sick at some time during the year.

*Maternity and Child Welfare Work* continued to make good progress during the year despite the fact that no increase in accommodation

was possible. To the Maternity Ward of the Connaught Hospital 607 patients were admitted 402 gave birth in the Ward and 6 maternal deaths occurred. In addition 205 women were treated in the Ward for various ailments. A new Maternity Training Centre with 4 private wards, accommodation for 40 patients ante- and post natal and Infant Clinics is to be erected.

The voluntary training of midwives commenced two years ago has continued to make satisfactory progress. two trainees have obtained the local C.M.B. and six others are still in training.

At the Ante-Natal Clinic 716 women were on the register as new cases and total attendances numbered 5 510. Women delivered of their babies in the Maternity Ward of the Connaught Hospital and mothers delivered in their own homes are advised to attend the *Post Natal Clinic* for supervision advice and necessary treatment. During the year 477 such cases were dealt with and 1 157 attendances recorded. Twice a week throughout the year *Infant Welfare Clinics* are held at the Maternity Centre. 536 infants were registered and 12,584 subsequent attendances recorded. The *Health Visitors* attached to this Centre made 10 189 visits to 787 newly born babies.

It is to be noted that Infant Welfare and other Clinics were inaugurated at every Medical Officers station throughout the year. This movement was very popular with the Paramount Chiefs and the results most gratifying. Dr W. ALLAN describes in some detail an account of the 1936 *Health and Baby Meeting* which was held from March 1st to 7th.

At the various *Mission Hospitals* also Maternity and Child Welfare Work has been successfully carried out. The authorities of the Princess Christian Mission Hospital opened a new clinic at Yongro where good progress is being made.

*School Hygiene*—Routine inspections continue to be impossible owing to shortage of necessary staff (see this *Bulletin* 1937 Supp p 30\*) but visits have been made as occasion demanded. Some improvement in the sanitary condition of the schools is reported. The elementary principles of hygiene continue to be taught in Colony and Protectorate Schools.

*Public Health Sanitation etc*—Intensive vigour characterized the routine measures to combat insect borne diseases both in the Colony and the Protectorate with very satisfactory results. A detailed report of the work carried out in the Freetown area is included in the Annual Report under review.

With regard to *sewage disposal* it is said conditions remain the same as in 1935 (see this *Bulletin* 1935 Supp p 25\* and 1936 Supp p 26\*). The introduction of a water borne sewage system in Freetown is under consideration. In the Protectorate where pit latrines are universal good progress was made with the digging of latrines in the smaller villages which previously had no sanitation. In Freetown *Refuse disposal* schemes continue to function satisfactorily and in the Protectorate the bush type incinerators are becoming increasingly popular (see this *Bulletin* 1937 Supp p 30\*).

In Freetown *water supplies* were restricted during the dry season. The question of augmenting existing sources with a view to preventing the recurrent shortage each dry season continues to receive careful attention and there is reason to hope that these inconveniences will shortly be disposed of. During the year 16 new public standposts were erected and 18 new private services laid on. Supplies in the

Protectorate remain as described in these pages a year ago. Steps are being taken with a view to providing pipe-borne supplies to certain towns.

Owing to increased activity in the mining areas more and more labourers tend to be employed. Mining camps are inspected by Sanitary Officers the steady increase in the numbers of labourers employed has greatly increased the work of sanitary supervision etc. of areas and made it difficult at times to maintain the necessary force of sanitary labourers.

*Housing and Town Planning* conditions remain much as described in the 1935 Report (see this *Bulletin* 1937 Supp. p. 30\*)

As regards *foodstuffs etc.* markets continue to be inspected daily and weekly reports as to their condition are rendered. Other premises are inspected regularly and nuisances reported and abated foodstuffs exposed for sale and found unfit for human consumption are seized and destroyed (see also this *Bulletin* 1937 Supp. p. 30\*)

The *Health Weeks* have proved so markedly successful that they are to be made annual events.

In the absence of new recruits the *training of Sanitary Personnel* was confined to refresher courses for existing sanitary inspectors. The practice of bringing these men to headquarters from their outstations for further instruction has greatly contributed to their increased efficiency.

*Port Health Work*—Though cases of yellow fever plague and smallpox were reported from neighbouring colonies Freetown was not in quarantine at any time during the year. Ships entering the Port numbered 825 deck passengers disembarking numbered 1 731 and embarking 1,204 with Kroo boys disembarking 18,963 and embarking 16 753. Of these 578 deck passengers and 2,262 Kroo boys were vaccinated while 837 of the former and 4,659 of the latter were passed through the Disinfecting Station.

*Hospitals Dispensaries etc.*—An increase in the numbers both of in and out patients treated at the various Hospitals is reported the greatest increase occurring in the Protectorate. It is believed the increases are not evidence of a greater amount of sickness but rather reflect the growing readiness of the people to seek treatment by European methods.

At the European Hospital improvements carried out provide increased accommodation a new hospital is to be erected and should be completed early in 1938. One new Protectorate type hospital was erected at Port Loko during 1936. The five *Mission Hospitals* subsidised by Government continue to carry out excellent work and report increases in the numbers of patients treated.

Two new Dispensaries were opened in the Protectorate there are now 8 such treatment centres in the Colony and 14 in the Protectorate.

The record of bed accommodation available and work accomplished during 1936 at Government and Mission Hospitals reads as follows —

Hospital	Beds	In-patients	Deaths	Out-patients
1 European	14	187	2	474
10 African ..	334	5,594	375	110 537
8 Mission	92	21,945(?)		1,251(?)

[It will be noted that in patients at Mission Hospitals appear to have been twenty times more numerous. The facts are reproduced as they are given on p 45 of the Report under review. Probably the figures should be reversed.]

The principal diseases and numbers treated at various institutions during the year included *acute and chronic bronchitis* 12,884 *acute and chronic rheumatism* 10,808 *hernia* 9,701 *yaws* 8,202 *malaria* 7,942 *wounds and injuries* 6,082. Textual commentaries relating to morbidity experience are briefly summarized hereafter.

*Malaria* cases treated totalled 7,931 with 4 deaths the distribution by race and type of infection being —

	Benign Tertian	Quartan	Sub- tertian	Cache- xia	Unclassi- fied	Deaths
Europeans	8	7	65	—	47	—
Africans	51	199	746	258	6,550	4
Totals	59	206	811	258	6,597	4

There were also 2 non fatal cases of *blackwater fever* among Europeans and 8 among Africans with 4 deaths.

During the year arrangements were made for the purchase of quinine at all Post Offices throughout the Colony and Protectorate the drug was also distributed by Political Officers on tour in remote parts of the country. These arrangements which have been much appreciated bring quinine within the easy reach of everybody. At the Laboratory where 3,461 blood films were examined 1,308 were positive for malaria parasites and the findings 936 *subtertian* 236 *quartan* 3 *benign tertian* 133 mixed infections the latter including 131 *subtertian* and *quartan* infections.

One non fatal case of *yellow fever* was reported in an African soldier of the Sierra Leone Battalion R.W.A.F.F. stationed at Daru 214 miles from Freetown. The patient had been on leave at Baiama a village 45 miles distant. All precautions were taken and an intensive inspection of surrounding villages undertaken. blood specimens taken in Baiama proved negative but at two other villages positive reactions were 42.8 and 55.5 per cent respectively. The blood specimens were taken from children under 10 years of age and the results of protection tests suggest that an epidemic has occurred in the district in recent years.

No case of *cerebrospinal meningitis relapsing fever plague* or *human rabies* was reported. Rat-catching continued 6,892 were caught and 4,644 dissected all being negative for *P. pestis*. The dog catching gang captured 1,849 stray dogs and these were destroyed. The majority of the 99 persons who received anti rabic treatment were dog-catchers. The brains of 13 dogs and 7 cats were examined 13 (12 dogs 1 cat) proving positive for *negri bodies*.

The outbreak of *smallpox* which began in 1932 is gradually burning itself out as the result of vaccination. During the year a single undetected case in the Protectorate gave rise to 12 cases introduced into Freetown. a small localized outbreak resulted which was easily controlled. The distribution of cases and deaths was —

and that carried out at the Hospital Laboratory during the year. Under such headings as *malaria*, *yellow fever*, *typhus*, *prisons*, etc., above reference has been made to laboratory activities and findings but it remains to say that in addition to other serological work, 723 Kahn tests were carried out with 356 positive and 23 doubtful results; sputum examinations totalled 337 and of these 79 were found to contain acid fast bacilli.

*Financial*.—Total expenditure on Medical and Sanitary Services during 1933 amounted to £68,893 of which £48,744 represented Medical Expenditure.

P. Granville Edge

### COLONY OF THE GAMBIA (1933)

The Colony of the Gambia was created in 1843 previously from 1807 having been under the Government of Sierra Leone and was constituted a separate government 45 years later in 1888. It now consists of the island of St. Mary (on which is Bathurst, the seat of Government), British Kombo, Albreda, the Ceded Mile, the territories of Brefet and Bayana and MacCarthy Island. This last forms the line of demarcation between the Upper and Lower portions of the Gambia River. The total area of the Colony and Protectorate is 4 13<sup>7</sup> sq. miles.

*Vital Statistics*.—Attention is again called to the fact that the estimated population is a doubtful figure and will remain erroneous until the next general census is carried out. The principal vital statistical facts relating to Bathurst may be set out as follows:—

Item	Africans	Europeans and Whites
Estimated Population	14,141	195
Total Births recorded	357	—
Birth Rate	25.2	—
Total Deaths recorded	431	—
Death Rate	30.5	—
Infant Deaths recorded	132	—
I.M.R. per 1,000 live births	300.7	—
Stillbirths recorded	60	—

Among the Europeans and Whites the *General European Population* (excluding Government Officials) numbered 128 and among this group no births or deaths were recorded.

*European Officials* resident numbered 69 with an average number resident of 59. No deaths were recorded but 37 officials were on the sick list, subtertian malaria being responsible for 18 cases, the remaining 19 being mostly due to minor ailments. Three were invalided. *African Officials* resident numbered 387 with an average number resident of 348. No deaths were recorded but 320 were on the sick list, and two were invalided during the year.

*Maternity and Child Welfare Work*.—In the Clinic Ward, Victoria Hospital, Bathurst, 88 ante-natal patients made 1,080 attendances, 72 confinements were conducted and 119 births were recorded. Of the latter 101 were live births and 18 died so that the Clinic I.M.R. was 129.7 per 1,000 live births. In the Outpatients Department

there were 268 babies on the registers and 228 patients attended the ante-natal clinics

During the year it was decided to extend the Child Welfare activities outside Bathurst and Sukuta was decided upon as a suitable centre since it was within easy reach of the capital. Buildings were loaned by the Methodist Mission the cost of necessary alterations etc. being met by the Provincial Emergency and Development Fund. At this new centre 284 patients made 1,890 attendances 8 ante-natal patients made 36 attendances and deliveries numbered 4

*School Hygiene*—The only information relating to this subject records that pamphlets and booklets on health matters were distributed to schools and that the Dental Surgeon inspected 1 673 school children 35 per cent of whom were given dental treatment.

*Public Health Sanitation etc*—The year under review was characterized by a steady increase in the scope of the activities of the Medical and Sanitary Department Not only was progress maintained in Bathurst but a most promising start was made with sanitary reforms in the Protectorate (see under *Child Welfare Hospitals Leprosy*) Special attention was devoted to mosquito control measures a considerable amount of tree cutting was recorded while routine work concerned with the grading clearing and oiling of earth drains was continued Energetic action was taken to deal with the thousands of crab holes which constitute prolific breeding places for mosquitoes investigations are being undertaken into the habits and life history of these crabs with a view to devising some method of dealing with them effectively Inadequate drainage is said to be the most important problem with which Bathurst has to deal the numerous earth drains which are responsible for considerable recurrent expenditure for upkeep repairs etc should be replaced by properly constructed concrete drains.

Methods of *Sewage disposal* remain for all practical purposes unchanged but alternative methods are receiving consideration experiments with septic tank latrines are in progress and a number of public latrines were constructed during the year In the Protectorate most of the pit latrines collapsed during the rains and bush septic tank latrines were sent to the large outstations The system of *refuse disposal* (see this *Bulletin* 1937 Supp p 36\*) functions for the most part satisfactorily

With regard to *water supplies* the old water mains are gradually being replaced throughout Bathurst and a chlormination plant has been installed at the waterworks The position regarding *housing* in Bathurst is unchanged (see this *Bulletin* 1937 Supp p 36\*) The Report observes "Nearer and nearer to us each year creeps plague. We are in no position to withstand it and shall not be until the miserable hovels so prevalent here are razed to the ground and proper rat proof buildings erected in their stead.

A special section of the Report deals with various aspects of medical work in the Protectorate Sanitary Inspectors with labour gangs have been stationed at the more important centres the Public Health Ordinance applied to these places and attention was devoted to the construction of latrines incinerators etc. travelling vaccinators visited the areas at intervals and market sites improved

*Port Health Work*—During the year 259 ships were boarded deck passengers were inspected and kept under surveillance when necessary All the 101 aeroplanes landing had clean Bills of Health Quarantine

diseases. Six such cases were suspected of being *tropical typhus* but though these were not confirmed serologically a 50 per cent. mortality indicates the seriousness of the condition and the urgent need of pathological investigations to be undertaken. Steps are being taken to meet this need.

Of *helminthic diseases* the Report observes "the figures give no indication of the prevalence of these diseases—especially is this the case with regard to *ankylostomiasis* the incidence of which must run into tens of thousands." Hospital returns show 1,040 cases of *ascariasis* only 136 of *ankylostomiasis* 90 *taeniasis* 4 *dracunculiasis* 47 of *schistosomiasis* and "other helminths" 8. The Report states that "the incidence of these diseases must be considerably higher in the Protectorate" and in this connexion it is not without interest to note that only 11 cases of *ankylostomiasis* and 274 of *ascariasis* were recorded in Protectorate hospitals.

In the text of the Report reference is made to 434 cases of *leprosy* hospital returns record only 358 cases 284 of these being treated in hospitals in the Protectorate. Reference has already been made to the new leper camp at Buruko (see Hospitals above). This centre which takes in cases from the Upper River and MacCarthy Island Provinces dealt with 108 patients during the year. It is stated that where continued treatment with Alepil is available many patients show definite improvement. The need for another Leper Camp for North and South Bank Provinces is to be met by the establishment of a centre near Bwiam.

*General Diseases* are unmentioned in the text of the Report but Hospital Returns show 197 cases of *syphilis* and 642 of *gonococcal infections*. *Yaws* was responsible for 4,046 cases. The disease is said to be definitely increasing while incidence increases with distance from the coast only 154 cases were dealt with in Bathurst but in the Georgetown Hospital there were no less than 1,848, over a quarter of the total patients treated for all causes of sickness (see also this Bulletin 1937 Supp. p. 37\*).

*Other diseases* mentioned include *whooping cough* 283 cases (275 in Bathurst alone) *influenza* 87 cases *tetanus* 35 and *measles* only 2 cases. Although only 35 cases of *tetanus* are recorded—with 13 deaths—it may be noted that total deaths due to this cause in the Colony and Protectorate numbered 46 and 34 of these were ascribed to *tetanus neonatorum*. Rules for midwives have been introduced with a view to reducing the number of cases of this easily preventable disease.

*Scientific*—Dr MURGATROYD of the Liverpool School of Tropical Medicine was engaged in chemotherapy studies in relation to trypanosomiasis. The Victoria Hospital Laboratory Report briefly records the numbers of specimens of various kinds examined during the year but results of these examinations are not supplied.

*Financial*.—Actual expenditure on Medical and Health Services during 1936 amounted to £30,895 as compared with an estimated expenditure of £32,336. Medical Department expenditure accounted for 11.9 per cent. of the total expenditure of the Colony.

P. Granville Edge

## REVIEWS AND NOTICES

VOCHT (Bernard) [M.D. Professor at the Institute of Tropical Medicine Hamburg] & MAYER (Martin) [M.D. Professor at the Institute of Tropical Medicine Hamburg] *Malaria. A Handbook of Treatment, Parasitology and Prevention* With a Foreword by Sir Rickard CHRISTOPHERS C.I.E. F.R.S.—pp viii + 196 With 25 figs & 2 coloured plates. 1937 London John Bale Medical Publications 85 Great Titchfield Street W.1 [10s. 6d.]

This is an English translation of the second edition of a small handbook on malaria originally intended to provide a useful account of this disease suitable for post-graduate students and medical men attending lectures or courses at the Hamburg School of Tropical Medicine. It forms a well proportioned and up-to-date summary of the clinical parasitological and pathological aspects of malaria and of its treatment and medicinal prophylaxis. It is especially noticeable for the detailed account given of the latter two subjects and for the very full information regarding the new synthetic antimalarial compounds which is more complete than that to be obtained in any other work of the kind known to the reviewer. Following a brief introduction some twelve pages are given to an account of the clinical picture of malaria dealing with the incubation period and latency, prodromal symptoms, features of the acute attack as seen in the different forms of parasite and subsequent course of the disease. Unusual types (pernicious and other) the characters of the disease in children and common after-effects occupy a further twelve pages which with a discussion on diagnosis and prognosis concludes this portion of the book.

In the section on treatment (41 pages) an account is given of quinine, atabrin and plasmoquine as used in treatment and medicinal prophylaxis. Very full details are given regarding the methods of administration of the different drugs, their possible toxic effects, their effectiveness against the attack and liability to subsequent relapses as well as suitability for continued use in the case of medicinal prophylaxis. Quinine (except in rare cases of idiosyncrasy) is outstandingly non-toxic and (specially important from the point of view of medicinal prophylaxis) there is little tendency to accumulate in the body. Various methods of administration and forms of treatment are discussed and a reference made to the use of some other cinchona alkaloids and derivatives. Quinidine and hydroquinine (dextro-rotatory compounds) are almost if not quite as effective as quinine (the latter possibly more so) and are stated by certain authorities not to cause undesirable effects in cases of idiosyncrasy to quinine itself. As is now almost universally recognised the oral method of administration is that which should be adopted in all cases where there is no special indication to the contrary. This applies both to quinine and atabrin though the objection to intramuscular use which amounts almost to malpraxis in the former case is much less cogent with atabrin since the local effect on the tissues has been shown to be much less marked and the drug rapidly absorbed. For treatment of the attack with quinine a dose of 15 grams daily is effective and should be continued up to the fifth day after decline of the fever. Severe cases of malignant tertian



IMMS (A. D.) [M.A. D Sc. F.R.S. Reader in Entomology of Cambridge]  
*Recent Advances in Entomology* Second Edition.—pp x + 431  
 With 94 figs. 1937 London J & A Churchill Ltd. 104  
 Gloucester Place Portman Square [15s]

The avoidance of disease-carrying insects and their effective destruction or control by the most economical means demands an intimate knowledge of their life-history or as it is usually called to-day, their ecology. Important aspects of ecology with which the medical entomologist is constantly faced concern the effects of climate of temperature moisture and drought or the effects of nutrition, upon the prevalence of insects as determined by their rates of multiplication and power of survival. Much can be learned from an empirical study in the laboratory of the effects of the various ecological factors upon individual insects or populations of insects particularly if such a study is checked and compared at every stage by observations in the field. That is the technique which at the present time is leading to a far better understanding of many groups of insects, notably the tsetse flies and the plague-carrying fleas.

But when the analysis is pressed further these ecological factors can exert their effects on the insect populations only by their influence upon the physiology of individual insects. So that for the proper understanding of ecology we need a thorough knowledge of insect physiology. Indeed were the physiology of a given species sufficiently well known many of its ecological responses to the environment could be predicted. And as ecology is based on physiology so of course is physiology based on morphology.

These inter relations between medicine and agriculture on the one hand and academic entomology on the other are well illustrated in Imms' *Recent Advances in Entomology* the second edition of which has just been published. This edition is larger than its predecessor by 56 pages but it deals with the same range of subjects: morphology metamorphosis, palaeontology, sense organs and behaviour coloration many aspects of ecology and their practical application parasitism and biological control. On the applied side most of the examples are from agriculture. There is an account of the biological races of mosquitoes, which is perhaps not better than can be readily found elsewhere but it is of undoubted value to the medical entomologist to see this problem related to the question of biological races in general.

V B Wigglesworth

It is with deep regret that we record the death on January 25th of Sir THOMAS STANTON K.C.M.G. Chief Medical Adviser to the Secretary of State for the Colonies and Chairman of the Honorary Managing Committee of the Bureau from 1928 to the date of his death.

We also record with regret the death on January 18th of Major E. E. AUSTIN D.S.O. a Sectional Editor of this Bulletin.

# TROPICAL DISEASES BULLETIN

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## RABIES

### A REVIEW OF RECENT ARTICLES—XXVIII\*

Further reports have been received regarding rabies in Trinidad<sup>1</sup> In 1936 there were only 4 human cases of acute ascending transverse myelitis as compared with 21 in the previous year. An extensive scheme for the destruction of *Desmodus* bats has been in operation throughout the year. Many were destroyed and a corresponding fall has occurred in the numbers of animals bitten. Of 3 623 *Desmodus* captured 99 or 2.7 per cent contained Negri bodies. In addition 1 661 fruit and insect eating bats were examined and in two only were Negri bodies found. The discovery by CLARK and DUNN [I can find no trace of this] that blood lapping bats are capable of surviving for long periods on defibrinated blood rendered it possible to examine under artificial conditions the progress of rabies in these wild nocturnal animals. Human animal and bat strains were inoculated into vampires and it was found that the incubation period varied from 9 to 150 days that the disease assumed forms varying from fury to paralysis and that the furious form may end in recovery.

The epidemiology of rabies in the island of Cuba during the last 10 years is discussed by ARENAS MARTORELL and HERRADA LLIBRE.<sup>2</sup> Human deaths declined from 9 cases in 1927 to zero whilst the number of animal cases has diminished from 144 to 20.

A recapitulation of THOMAS and MENTZ's<sup>3</sup> observations on rabies in South Africa with special reference to the genet and the mongoose as carriers of the disease is published in popular form.

\* For the twenty seventh of this series see this *Bulletin* 1937 Vol 34 p 671

<sup>1</sup>TRINIDAD AND TOROGO. ANNUAL MEDICAL AND SANITARY REPORT FOR THE YEAR ENDED ON THE 31st DECEMBER, 1936 [RANKINE (A.) Director of Medical Services]—[Rabies pp 52-54]

<sup>2</sup>ARENAS MARTORELL (Rogelio) & HERRADA LLIBRE (Manuel). Estudio epidemiológico de la rabia en los últimos 10 años—*Rev Med Trop y Parasit Habana* 1937 May-June Vol. 3 No. 3 pp 193-206

<sup>3</sup>THOMAS (A. D.) & MENTZ (W. O.) Wild Carnivora as Carriers of Rabies—*Public Health Johannesburg* 1937 Apr Vol 2. No 3 pp 16-17 19-21 23-5 32

of the virus in the blood and tissues they believe that death is provoked by the localization of the virus in the nerve axis and in the spinal ganglia.

LÉPINE and SAUTTER<sup>14</sup> also describe lesions found in the nervous system in pseudo-rabies.

A case of the pseudo-rabies of AUJESKY in a dog is described by TUNÇMAN<sup>15</sup>. This he believes to be the first case described in Asia. The symptoms are described and appear to be typical. Rabbits were infected in the usual way by inoculation.

## ii. Symptomatology

A case of human rabies which occurred in the Belgian Congo is described by CHESTERMAN and LIEGEYS<sup>16</sup>. The patient had received a full course of treatment with killed phenol vaccine.

## iii. Pathology

The infectivity of the saliva in the bat borne paralytic rabies of Trinidad is examined by PAWAN<sup>17</sup>. He has investigated cases of the disease in cattle horses vampire bats and human beings and found their saliva highly infective to rabbits. The saliva was gathered by sterile swabs from the mouth.

Estimations of blood sugar in animals suffering from fixed and street virus infection have been made by REMLINGER and BAILLY<sup>18</sup>. They find that in both cases there is an elevation in titre, but of small degree.

The urea content of the blood has also been examined by the same authors,<sup>19</sup> and in this case they find evidence of a considerable increase in blood nitrogen in dogs and rabbits suffering from rabies.

As the result of a careful and extended series of experiments on the content in the blood of rabicidal substances after treatment by different vaccines, DONERO<sup>20</sup> shows that better results can be attained by vaccines which are made from cords dried over short periods (0 to 2 days) than from those prepared from cords dried over longer periods.

A somewhat similar line of research has been pursued by CRUVEILHIER and VIALA<sup>21</sup> in the case of persons undergoing treatment and of rabbits

<sup>14</sup>LÉPINE (P.) & SAUTTER (V.). Lésions du système nerveux dans la maladie d'Aujesky.—C. R. Soc. Biol. 1937 Vol. 128 No. 31 pp. 753-756 With 3 figs.

<sup>15</sup>TUNÇMAN (Zekeri Mümmim). Le premier cas asiatique de la maladie d'Aujesky observé chez un chien.—Bull. Acad. Méd. 1937 Oct. 12 101st Year 3rd Ser. Vol. 118 No. 30 pp. 240-241.

<sup>16</sup>CHESTERMAN (Clément C.) & LIEGEYS (Paul). Un cas de rage humaine au Congo Belge.—A. Soc. Belge d. Méd. Trep. 1937 Sept. 30 Vol. 17 No. 3 pp. 299-303 [13 refs.]

<sup>17</sup>PAWAN (J. L.). Infectivity of the Saliva in Paralytic Rabies.—In Trep. Med. & Parasit. 1937 July 13 Vol. 31 No. 2 pp. 267-270 With 1 fig.

<sup>18</sup>REMLINGER (P.) & BAILLY (J.). La glycémie des animaux atteints de rage.—C. R. Soc. Biol. 1937 Vol. 125 No. 21 pp. 708-711.

<sup>19</sup>REMLINGER (P.) & BAILLY (J.). L'urée sanguine dans la rage expérimentale du chien et du lapin.—C. R. Soc. Biol. 1937 Vol. 125 No. 16 pp. 220-222.

<sup>20</sup>DONERO (J.). Recherche des substances rabicides chez les mordus traités.—Ann. Inst. Pasteur 1937 Oct. Vol. 59 No. 4 pp. 383-402 With 1 chart.

<sup>21</sup>CRUVEILHIER (L.) & VIALA (Ch.). Pouvoir rabicide et immunité antirabique.—A. n. Inst. Pasteur 1937 Ang. Vol. 89 No. 2. pp. 207-215.

experimentally immunized. Six rabbits received 15 injections six received 18 injections six received 21 injections and six received 25 injections of antirabic vaccine. In the blood of 22 of the 24 animals rabicidal substances were found after varying periods.

In an English summary of a paper by YAMAKI<sup>23</sup> it is stated that the pH of the body fluids (venous blood subcutaneous tissue fluid) of 10 rabbits which had been experimentally infected with rabies showed an increase when paralytic symptoms supervened.

The content of vitamin C in the brain the cerebrospinal fluid and the aqueous humour in rabbits experimentally infected with rabies has been estimated by UNO<sup>24</sup>. The 2-6 dichlorophenol indophenol method of estimation was employed. There was no fluctuation in the aqueous humour perhaps a slight increase in the cerebrospinal fluid and no variation in the brain substance.

### 15. Methods of Treatment and Statistics

A number of interesting results of experiments on factors which may influence the immunizing properties of antirabic vaccines have been carried out by SHORTT, MCGUIRE, BROOKS, STEPHENS and LAHIRI<sup>25</sup>. These experiments have all been carried out on monkeys. Five tests on the relative influences of phenol (0.6 per cent) and formalin (0.2 per cent) upon the immunizing properties of the vaccine were carried out of which the combined result is as follows —

	Died Rabies	Died Otherwise	Escaped	Totals	Mortality Percentage
Formalin	14	7	75	96	15.7
Phenol	32	8	134	174	19.2
Controls	38	0	15	51	70.5

This table as the authors say shows a slight advantage in the use of formalin but this is not significant. (A difference equal to or greater than that observed would be expected to occur 2 times out of 5 on the assumption that the two preservatives did not differ).

As a considerable number of monkeys which had been used in various experiments in connection with antirabic immunization was found to be available it was decided to utilize these in an attempt to determine the presence and degree of immunity existing six months and more after the last immunizing dose.

<sup>23</sup>YAMAKI (Hiroo). On the Change of the pH Value of the Body Fluid in the Experimental Hydrophobia of Rabbits.—*Oriental Jl Dis Infants* 1937 May Vol. 21 No. 3 [In Japanese English summary p. 76.]

<sup>24</sup>UNO (Tojiro). Contribution to the Knowledge of Experimental Rabies especially concerning the Vitamin-C Content (Reducing Type) of the Brain as Well as the Humour of Eye Chamber and the Cerebrospinal Fluid.—*Oriental Jl Dis Infants* 1937 May Vol. 21 No. 3 [In Japanese English summary pp. 79-80.]

<sup>25</sup>SHORTT (H. E.), MCGUIRE (J. P.), BROOKS (A. G.), STEPHENS (E. D.) & LAHIRI (B. N.). The Relative Immunizing Values of Different Forms of Antirabic Vaccine and the Duration of Immunity in Experimentally Immunized Animals.—*Indian Jl Med Res* 1937 Oct. Vol. 25 No. 2 pp. 483-497.

The monkeys available were those which had escaped the results of infection with street virus in the experiments previously described, and had therefore each been through the following process of immunization —

- (a) A course of vaccine containing killed fixed virus.  
 (b) A single inoculation with living and fully virulent street virus.  
 The results may be summarized in the following table —

	Number of Monkeys	Died		Mortality Percentage
		Rabies	Otherwise	
1 Formalin 5 per cent rabbit vaccine Kasauli strain	26	2	1	8.0
2 Formalin 5 per cent rabbit vaccine Paris strain	24	0	0	0
3 Carbolyzed 5 per cent rabbit vaccine Kasauli strain	23	2	1	9.0
4 Carbolyzed 5 per cent rabbit vaccine Paris strain	24	0	1	0
5 Carbolyzed 5 per cent rabbit vaccine polyvalent	23	4	0	16.0
6 Carbolyzed 1 per cent sheep vaccine Paris strain	7	0	1	0
7 Carbolyzed 5 per cent sheep vaccine Paris strain	8	0	0	0
8 Controls	34	24	0	70.5

It will be seen that the degree of immunity in these experiments is much higher than in the previous experiments where the monkeys were tested a few weeks after immunization with dead vaccine only as a comparison with the first series of experiments described above will show. The reality of this greater immunity is also evidenced by the fact that the virulence of the infecting viruses is the same as in the previous experiments. The authors are inclined to attribute this high degree of immunity to the effect of the single dose of living fully virulent virus which the animals had received, and which conferred a degree of immunity not readily obtainable with dead vaccines.

In a paper of considerable interest LÉVINE and SAUTTER<sup>25</sup> describe experiments undertaken to assess the relative values of dried cord vaccines and phenol vaccines. These experiments have been conducted on rabbits and the most important are as follows: (a) of 40 rabbits treated by the cord method (using cords of 4, 3, and 2 days) and tested by street virus at various periods after the completion of treatment 14 resisted infection—a percentage of 35.

<sup>25</sup>LÉVINE (P.) & SAUTTER (V.) Essais expérimentaux sur la valeur pratique des vaccins antirabiques phénolés—*Ann. Inst. Pasteur* 1937 July Vol. 50 No 1 pp 39-56. [18 refs.]

Of 52 rabbits treated by phenol vaccine at differing concentrations (2.3 and 5 per cent) and kept at different temperatures (20 and 37°C.) tested before and after vaccination 32 survived i.e. a percentage of 61.7 [This is a significant difference in favour of phenol vaccine but in view of much evidence indicating that vaccination by cords and by phenol vaccines are equally efficacious the reviewer cannot accept this result without further confirmation.]

(b) A comparative study of phenol vaccines of various strengths was also made from which the authors conclude without giving figures that a vaccine of less than 5 per cent gives optimum results [Figures in support of this statement are not given.]

(c) The influence of keeping the vaccine at 20°C and at 37°C was also investigated. No significant difference was found (77.7 per cent as against 71.2 per cent of survivors). Nevertheless the authors conclude that as no paralytic accidents have occurred nor has there been any indication of transmission of infection by treatment with virus kept at 20–21°C it is advisable to adopt this vaccine in preference to one kept at 37°C [Figures in support of this conclusion are not given the authors themselves refer to the fact that the numbers of animals employed were insufficient for absolute conclusions to be drawn. It is quite clear that the numbers were so small that no conclusions can be drawn regarding the innocuousness of the 20° vaccine as regards either liability to cause paralytic accident or liability in a proportion of cases to transmit infection. It will be remembered that COVELL, MCGUIRE STEPHENS and LAHIRI conducted a similar experiment with the same object (this *Bulletin* 1937 Vol. 34 p. 235). In the case of vaccine kept at room temperature and at 37°C for 24 hours no significant loss of efficiency was produced by incubating carbolyzed 5 per cent antirabic vaccine at 37°C for 24 hours. This experiment was carried out on 140 monkeys. In the face of such evidence it is impossible to accept LÉPINE and SAUTTER's conclusion.]

As he believes that vaccination by killed phenol vaccines is likely to be generally used in the future LÉPINE<sup>26</sup> describes in detail the technique which he has elaborated for their preparation and use. He adopts a vaccine containing 5 per cent. of virulent material and 1 per cent phenol. It is prepared from a Paris strain of fixed virus. To insure attenuation the vaccine is kept for 24 hours at a temperature of 20–23°C if the vaccine is not to be used for some time or at 37° if it is to be used immediately.

PROCA, BOBES and JONESCO<sup>27</sup> give the results which they have attained by combining the vaccinal treatment by heated vaccines with inoculations of antirabic serum. They believe that the effect of serum treatment is to prolong the incubation period and that it has reduced their mortality rates.

REMLINGER and BAILLY<sup>28</sup> have attempted to immunize rabbits by inhalation. The vaccine is dried powdered and then blown into the air passages. They have conducted 6 experiments on 45 animals

<sup>26</sup>LÉPINE (P.) Technique de préparation du vaccin antirabique phéniqué — *Rev. d'Hyg. et de Méd. Préventive* 1937 Oct.-Nov. Vol. 59 No. 8-9 pp. 555-562. With 2 figs.

<sup>27</sup>PROCA (G.) BOBES (S.) & JONESCO (D.) Sérothérapie de la rage — *Bull. Acad. Méd. Roumanie* 1937 Vol. 4 No. 5 pp. 609-617 [11 refs.]

<sup>28</sup>REMLINGER (P.) & BAILLY (J.) Echec de la vaccination antirabique par voie pulmonaire — *C. R. Soc. Biol.* 1937 Vol. 126 No. 25 pp. 208-210

(rabbits and guinea-pigs) but the results obtained with the treated were identical with those of the controls.

The statistics of treatment at the Pasteur Institute of Paris for the year 1936 are given by CRUVEILHIER and VIALA<sup>20</sup>. Of 463 persons treated none has developed rabies. One case of paralytic accident is reported. The symptoms were those of double facial paralysis, which lasted for 51 days.

It is reported by VANÍČEK<sup>21</sup> that since 1934 vaccination according to the Yugoslavian method of HEMPT has been in use in Czechoslovakia. This method was adopted on the statistical evidence furnished by the League of Nations reports. The administration of the vaccine has been decentralized as far as was possible.

In the state of Alabama U.S.A.<sup>22</sup> during the years 1922-1936 34,864 persons received antirabic treatment and of these 42 died of the disease. The methods of treatment employed have been from 1922-1930 "commercially prepared Pasteur treatments," and from 1930 till the present time Semple treatments. The mortality rates from year to year have varied between zero and 0.18 per cent. The figures are considered in detail and compared with those in the reviewer's 6th review regarding League of Nations statistics. The Alabama results compare very favourably with these. Paralytic accidents occurred in the proportion of 1 in 6,300.

#### v Postreccinal Paralysis.

IDRI<sup>23</sup> describes a case of Landry's ascending paralysis in a woman, bitten by a dog in the right leg. The method of treatment is not stated in the German summary. The woman died of a bulbar paralysis after an illness lasting 30 days. In the opinion of the author the paralysis was due to the treatment.

REMLINGER<sup>24</sup> with the object of convincing M. BARLET of the reality of cases of *rage de laboratoire* discusses a case presenting all the features of that regrettable occurrence.

#### vi Rabies in Animals

The case of a dog in which all the ordinary symptoms of rabies were simulated is described by ROSELL Y CARBOYELL<sup>25</sup>. The syndrome was in this case due to sympathetic reflexes occasioned by the local excitation of the gastric mucosa by a larva of *Noctuidos*. When the larva was expelled the symptoms ceased.

<sup>20</sup>CRUVEILHIER (L.) & VIALA (Ch.). Les vaccinations antirabiques à l'Institut Pasteur en 1936 - 4<sup>e</sup> *Ann. Inst. Pasteur* 1937 June. Vol 58 No 6. pp 721-725.

<sup>21</sup>VANÍČEK (F.). La vaccination antirabique décentralisée en Tchécoslovaquie par le vaccin de Hempt - *T. ann. Inst. d'Hyg. Pub. Etat Tchécoslov.* 1937 Vol 8 No 1 pp 8-13.

<sup>22</sup>DENBOW (George A.), McALPINE (James G.) & GELL (D. G.). Rabies Deaths in Alabama. Analysis of Case Histories with Regard to Treatment - *Amer. J. Public Health* 1937 Sept. Vol 27 No 9 pp 869-874.

<sup>23</sup>IDRI (Yoshitami). Ein Fall von Postlähmung infolge der Tollwutschutzimpfung - *Jl. Oriental Med.* 1937 Aug. Vol 27 No 2 [In Japanese pp 197-207 (13 refs.) German summary p 19].

<sup>24</sup>REMLINGER (P.). A propos de la rage de laboratoire - *Rev. d'Hyg. et de Méd. Préventive* 1937 June-July Vol 60 No 6-7 pp 477-478.

<sup>25</sup>ROSELL Y CARBOYELL (Alejandro). Síndrome rabídico producido por la existencia de una larva de la familia de los noctuidos en el tubo digestivo de un perro de 11 meses - *Rev. Med. Trop. y Parasit. Habana* 1937 May-June Vol 3 No 3 pp 219-225. With 1 fig.

BALAZET<sup>35</sup> furnishes further statistics regarding the antirabic vaccination of animals in Tunis. The present figures relate mainly to the year 1935 (for previous figures see this *Bulletin* 1933 Vol 30 p. 142 and p 585) It will be remembered that the method employed is the ether vaccine of REMLINGER and BAILLY. A table gives a résumé of the results from 1931 to 1935. With regard to preventive treatment the number of primary vaccinations was 1 203 of re-vaccinations 434. Accidents suspected to be due to the vaccine numbered 2 (0.11 per cent). No cases of rabies were observed amongst the vaccinated. As regards treatment after probable infection of 32 dogs none died of 30 horses one died and of 25 cattle three died.

#### VII Miscellaneous

ROCHAIX<sup>36</sup> has examined the records relating to rabbits experimentally inoculated with fixed virus at the Pasteur Institute of Lyons for evidence of seasonal variations. He finds that the mean duration of the incubation period varied as follows—In winter it was 6.33 days in spring 6.64 in summer 6.76 and in autumn 6.44 days. The monthly figures show a similar swing with maximum of about 6.9 in July and minima of 6.1 in October and 6.2 in January. A similar but much slighter variation was observed with regard to the duration of the illness. As these experiments were carried out in the dark and at constant temperature these factors cannot be considered responsible for this apparent variation. These results are based upon a total of 3,549 rabbits treated during 21 years.

A number of experiments comparing two different carbolized vaccines (the first, vaccine A prepared from rabbit brain the second B prepared from horse brain) have been carried out by SCHNEIDER<sup>37</sup> with the object of ascertaining whether the sheep is as good a test animal as the rabbit. The results in the two cases were as might be expected very similar. The author believes that his experiments show that the degree of protection produced depends on the amount of brain and cord tissue injected, whether it be in a single dose or multiple doses together with the length of time between the last dose of vaccine and the injection of the infective dose.

SCHWEINBURG and WOLFRAM<sup>38</sup> draw attention to the remarkable similarities which exist between the behaviour of rabies and pemphigus viruses although the resulting clinical manifestations are so different. As a consequence of this observation they were led to examine the behaviour of the two viruses by cross-immunity tests. They found that *in vitro* the serum of human cases of pemphigus and of rabbits immunized against pemphigus in the majority of cases has the property of destroying rabies virus (control sera with a very few exceptions did

<sup>35</sup>BALAZET (Lucien) La vaccination antirabique des animaux en Tunisie du 1er janvier au 31 décembre 1935.—*Arch Inst Pasteur de Tunis* 1936 Apr. Vol. 25 No 2, pp 353-361

<sup>36</sup>ROCHAIX (A.) Saisons et rage expérimentale chez le lapin.—*Mouvement Sanitaire* 1937 June. Vol. 14 No. 158, pp 306-309. With 2 charts

<sup>37</sup>SCHNEIDER (J. E.) The Utilization of Sheep in the Rabies Vaccine Protection Tests.—*J. Amer Vet Med Assoc* 1936 Dec. Vol. 89 No 6 pp. 671-676

<sup>38</sup>SCHWEINBURG (Fritz) & WOLFRAM (Stefan) Ueber serologische und immunologische Beziehungen zwischen den Erregern des Pemphigus und der Lyssa.—*Ztschr f Immunitätsf u Experim. Therap* 1937 Oct. 15 Vol. 91 No 4 pp. 341-360 [31 refs]



not possess this property) and that conversely rabies immune sera killed pemphigus with even greater regularity. Similarly *in vivo* it appeared that rabbits immune to rabies were also in most cases protected against pemphigus infection. Rabbits immunized against pemphigus are on the other hand *sometimes* immune to rabies.

SCHÖEN<sup>39</sup> following on experiments by LEVADITI and himself in which they found that street virus grows in the Brown-Pearce carcinoma (this *Bulletin* 1937 Vol 34 p. 678 and 1938, Vol. 33 p. 750) now extends their observations to other strains of virus, and to fixed virus. He has succeeded in many cases in transmitting infection by grafting of infective tumours on to the cornea. Negri-genesis is not however constant in the neoplastic tissue.

A communication from Bavaria in the *Reichs-Gesundheitsblatt*<sup>40</sup> deals with the measures to be adopted when a person is bitten by a rabid animal. It deals both with the care and treatment of the bitten person and with the handling of the biting animal.

A short general paper on rabies and the procedure of antirabic treatment is given by FRENCH<sup>41</sup> A G McKendrick.

<sup>39</sup>SCHÖEN (R.) Virus rabique de néoplasmes.—C. R. Soc. Biol. 1937 Vol. 123 No 23 pp 939-941

<sup>40</sup>REICHSGESUNDHEITSBLATT 1937 Nov 24 Vol 12 No 47 pp 772-774 —Watschutzbehandlungsstellen und Richtlinien zur Watschutzbehandlung

<sup>41</sup>FRENCH (S. Gay) Rabies in China, with Notes on Six Cases of Pasteur Treatment.—Jl. Roy. Soc. Med. Ser. 1937 Oct. Vol 23, No 4 pp 310-314

## LEISHMANIASIS

CASTILLOX (T J E L) Le kala azar en France [Kala Azar in France.]—*Rev Service Santé Milit* 1937 May Vol 106 No 5 pp 701-750 With 1 fig [207 refs]

The article is a complete description of kala azar with special reference to the disease in France. Published in an army journal it is intended to instruct army medical officers and to warn them to be on the look-out for cases of the disease in France which are by no means uncommon.  
C M Wenyon

MONGES (J) GIRAUD (P) & MONGES (F) Deux nouveaux cas de kala-azar autochtone de l'adulte [Two New Cases of Endemic Kala Azar in the Adult.]—*Bull Soc Path Exot* 1937 Apr 14 Vol 30 No 4 pp 274-279

In reporting two cases of kala azar in adults in the Marseilles district the authors point out that this disease in adults can no longer be regarded as a rarity in the South of France. There was nothing peculiar about these cases both of which responded to neostibosan and were cured  
C M W

VANNI (Vittorio) Leishmaniosi viscerale dell'adulto autoctona a Venezia. [Endemic Kala Azar in an Adult in Venice.]—*Policlinico Sez. Prat* 1937 June 14 Vol. 44 No 24 pp 1148 1151-1152

The discovery of a case of kala azar in an adult in Venice adds another locality to the list given by ASCOLI of the places in Italy where this disease in adults occurs.  
C M W

MI (C H) & YANG (C T) Kala-Azar in Nanchang.—*Chinese Med J* 1937 May Vol 51 No 5 pp 669-670

The record of a case of kala azar in a soldier 40 years of age in Nanchang. This is the first case of the disease to be diagnosed in this place but there is evidence that infection occurred north of the Yangtze river  
C M W

SANGIORGI (Giuseppe) Pluralità del virus donovanico? [Plurality of *Leishmania donovani* Virus?]—*Pathologica* 1937 Apr 15 Vol. 29 No 546 pp 140-142. English summary (10 lines)

Examining smears of spleen puncture material from a case of kala azar in an adult in Italy the author finds that there were two types of parasite in the smear so that he considers that two different leishmanias are represented. This duality of species has no relation to the distinctions which can be drawn between *L. donovani* and *L. infantum* on aetiological grounds  
C M W

LAURINSICH (A.) Coltivabilità del parassita di Leishman nel latte di capra. [Culture of *Leishmania* in Goat's Milk.]—*Pediatrics* 1937 Oct 1 Vol 45 No 10 pp 857-866 [10 refs.]

The author has tested the effect of adding goat's milk to culture media for leishmania. The best results were obtained by adding milk, after separation of fat to the liquid of condensation in N N N medium.  
C M W

HENDERSON (L. H.) Clinical Observations on Kala Azar in the Fung Province of the Sudan.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937 July 31 Vol. 31 No. 2 pp. 179-190 With 1 map in text & 4 figs. on 3 plates.

The paper gives a clinical and epidemiological account of kala azar as seen by the author in over 300 cases treated by him between 1933 and 1936 in the Fung province of the Sudan. The paper should be read in conjunction with that by ARCHIBALD and MANBOUR (this *Bulletin* 1937 Vol. 34 p. 567) on the same subject. The cases occurred in the villages along the Blue Nile and its tributaries from the Abyssinian border to a point about 150 miles south of Khartoum. In this district the river flows through an open flat plain of thick loam and falls only 200 feet in 200 miles. The temperature rarely falls below 60°F while the mean relative humidity is from 50 to 55 per cent. The rainy season commences in April with a 10 mm. rainfall. This reaches a maximum in August with 200 mm. and then subsides up to the commencement of the dry season in November. As far as could be judged the majority of cases showed their first symptoms between August and February. The disease attacks mainly children and young adults and was most liable to occur amongst those in a state of malnutrition. There were exceptions to this rule however as cases occurred amongst the well-fed police. A history of familial infection was not uncommon. The parasite was always present in the spleen, in 1 per cent. of the cases in the blood and in 7.5 per cent. in the nasal secretion. The symptomatology was similar to kala azar elsewhere. As regards treatment the routine procedure was adopted of giving a course of neostibosan followed by one or two courses of tartar emetic. To this treatment the children responded more readily than the adults, amongst whom were some peculiarly resistant cases. C. M. W.

WRIGHT (R. E.) Affections of the Eye in the Malarial Fevers and Kala-Azar.—*Indian Med. Gaz.* 1937 June Vol. 72 No. 6 pp. 363-367 [18 refs.]

The paper discusses eye lesions in malaria and kala azar and points out that retinal haemorrhages into the posterior segment of the eye appear to be the only conditions which can claim to have relation to these diseases. Even these are perhaps more dependent on the severity of the anaemia than on the toxæmia. Malarial keratitis was at one time regarded as a possibility but is now looked upon more doubtfully. C. M. W.

NAPIER (L. Everard) Pulmonary Tuberculosis and Kala Azar a Fatal Combination.—*Indian Med. Gaz.* 1937 Apr Vol. 72 No. 4 pp. 242-243. With 2 figs. on 1 plate & 1 chart.

The author notes that it is the experience in Calcutta that when kala azar is accompanied by some other disease or infection it is the kala azar which should be treated first. The presence of these other infections has not interfered with or hindered in any way the good effects of antimony medication. There is, however, one serious exception and this is pulmonary tuberculosis. The antimony treatment appears to aggravate this condition and two illustrative cases are

mentioned. It would appear therefore, that kala azar in the presence of pulmonary tuberculosis is a very serious condition for which there is no satisfactory treatment.

C M W

CHAGAS (E.) & ROMANA (Cecilio) Etude sur la leishmaniose viscérale en Argentine. Infection des ganglions lymphatiques [Visceral Leishmaniasis in the Argentine. Infection of the Lymphatic Glands.]—*C R Soc Biol* 1937 Vol. 125 No 15 pp 170-171 With 2 figs

The authors give a short account of a disease two cases of which they have encountered in the Chaco district of the Argentine. The symptoms appear to resemble those of kala azar while a leishmania can be demonstrated within endothelial cells in smears of liver and spleen puncture material and in sections of excised lymphatic glands. The parasites like other leishmania develop into leptomonas in suitable media. The relation of this disease to the visceral leishmaniasis of other parts of S America Africa and Asia has not yet been determined.

C M W

WANG (C W) The Examination of Blood Smears for *Leishmania donovani* in Kala-Azar Patients.—*Chinese Med J* 1937 Sept. Vol. 52 No 3 pp 433-438.

By means of Shortt's technique the peripheral blood of 23 proved cases of kala azar was examined for leishmania. Parasites were found in 39.1 per cent. of the cases at all stages of the disease. In Shortt's technique the blood film is made in the usual manner with the exception that the movement of the spreading slide is stopped towards the end of the film. It is then lifted quickly so that there is given to the film a straight end in which numbers of leucocytes are gathered. Infected cells are however frequently found in the lateral margins of ordinary blood films.

C M W

MALAMOS (Basilios) Versuche mit Leishmanien. I Immunisierungsversuche von Hamstern mit Kulturen und Immunsereen. II Der Einfluss von Kaninchenimmunsereum auf das Wachstum verschiedener Kulturen [Experiments with Leishmania. I. Attempts to immunize Hamsters with Cultures and Immune Serum. II. Influence of Immune Rabbit Serum on Growth of Various Cultures.]—*Arch f Schiffs u Trop Hyg* 1937 May Vol. 41 No 5 pp 416-422. [21 refs.]

It was found impossible to immunize hamsters against *Leishmania donovani* infection by injecting them with living avirulent cultures of the organism nor could hamsters be cured of an infection by the administration of immune serum prepared in rabbits. The immune serum tended however to prolong the disease. The addition of immune serum to cultures tended to retard the growth of leishmania to some extent but contrary to the results obtained by NOGUCHI and DA FONSECA, there was no specific action as regards different species of parasite.

C M W

MALAMOS (Basilos) Versuche mit Leishmanien. III Atypischer Verlauf einer Leishmania donovani-Infektion bei der weissen Maus. [Experiments with Leishmania. III. Atypical Course of a *Leishmania donovani* Infection in White Mice.]—Arch. f. Schiffs u. Trop. Hyg. 1937 Oct. Vol. 41 No. 10 pp. 641-644 With 1 fig. [13 refs.]

A strain of *Leishmania infantum* was isolated from a patient in white mice in which a generalized infection was produced. A second passage produced the same type of infection as also did the third in one animal, whereas in another there developed 425 days after injection an ascites characterized by a blood-stained exudate which recurred each time after withdrawal. Examination of the animal after death on the 456th day showed that there was a very intense leishmania infection of the pancreas and only a light infection of other organs. At no time either by direct examination of smears, culture or inoculation of animals, was it possible to demonstrate leishmania in the peritoneal exudate. C. M. H.

WESE (H.) Important Pharmaceutical Aspects of Solustibosan.—*Chinese Med. J.* 1937 Sept. Vol. 52 No. 3 pp. 421-424

In this paper the author gives an account of pharmacological experiments carried out on animals with solustibosan. In reasonable doses there is little if any local irritation following subcutaneous, intracutaneous, intramuscular or intravenous injections. The mouse will tolerate a subcutaneous dose of 43 cc. per kilo of body weight this amount being 25 per cent. more antimony than the corresponding tolerated dose of neostibosan. Intravenously the mouse will survive a dose of solustibosan representing three times the amount of antimony in the tolerated dose of neostibosan. This is due to the fact that in the dog after injections of solustibosan 80 per cent. of the antimony is excreted in the first 24 hours as against 50 per cent. for neostibosan. Experiments carried out on heart-lung preparations and smooth muscles showed that the drug was not irritating while no temperature reactions followed its injection. The animal experiments indicated that solustibosan could be given to animals without harmful effect, a result which was confirmed by injections in human beings.

C. M. H.

STRUTHERS (E. B.) The Treatment of Kala-Azar with Solustibosan, a New Antimony Compound.—*Chinese Med. J.* 1937 Sept. Vol. 52 No. 3 pp. 333-338.

The author gives an account of the treatment of 29 cases of kala azar in Tainan with solustibosan which is issued by Bayer & Co. in the form of a sterile stable solution of "pentavalent antimony hexonate" which contains 0.02 gm. of pentavalent antimony in 1 cc. As regards toxicity the mouse will tolerate 25 per cent. more antimony in the form of solustibosan than in the form of neostibosan. This greater tolerance is explained by the experiment in dogs which shows that the excretion of antimony in the urine is greater in the first 24 hours with solustibosan than with neostibosan. In the treatment of the cases the doses employed corresponded with the neostibosan dosage. Thus 2 cc. of solustibosan is approximately equal to 0.1 gm. of neostibosan which

contains 42 mgm of antimony. This dose was given on the first day and there followed doses of 6 cc. given on alternate days or sometimes daily till a total of 59 to 84.5 cc. had been given. In this series the injections have been by the intravenous route. The general result shows that of 26 cases which completed treatment 22 were discharged cured. It is evident that solustibosan will cure kala azar that it is relatively non toxic and that it has succeeded in certain cases which had not been cured by a full course of neostibosan. It has proved particularly valuable in several cases in the late toxic stage complicated by severe cancrum oris.

C M H

YATES (Theo. M.) 'SDT 561' in the Treatment of Kala-Azar —  
*Chinese Med J* 1937 Sept Vol. 52. No 3 pp 339-344

The author describes the treatment of 82 cases of kala azar by means of solustibosan. The total dosage has usually been 60 cc for every 100 lb of body weight. One exceptional case however had 94 cc in 26 injections. As there were no toxic symptoms the daily dosage was increased towards the end of the series so that in nine cases the course was completed in five days. Several adults were actually given injections of 20 cc without revealing any toxic effects. Of the cases treated 95.1 per cent. were discharged improved. This figure is compared with the figure of 94.6 per cent. for 629 cases treated the year before with another pentavalent antimony compound. It was generally admitted that the cases in which the treatment was completed in five days progressed better than the others. The new compound is evidently efficacious in the treatment of kala azar and has the advantage of being in the form of a stable solution which is ready for intravenous or intramuscular injection.

C M H

NAPIER (L. Everard) CHAUDHURI (R. N.) & CHAUDHURI (M. N. Rai)  
A Stable Solution of Antimony for the Treatment of Kala-Azar —  
*Indian Med Gaz* 1937 Aug Vol. 72. No 8 pp 462-465  
With 3 charts.

The authors have tried the new Bayer antimony product No 561 in the treatment of 10 cases of kala azar in Indians in Calcutta. The drug is issued in solution in ampoules and appears to be quite stable. In 1 cc. there are 20 mgm of antimony (metal) as compared with 21 mgm. in a 5 per cent solution of neostibosan. It is administered intramuscularly. Nine of the cases received 10 injections and one 8 injections. These were given on alternate days in six cases and daily in four. The total amount of antimony administered varied from 0.96 to 1.74 gm. The results were very satisfactory and, judging from the cessation of fever increase in weight and improvement in the blood picture it seems probable that all the cases were cured. The trials suggest that the drug is in the same class as neostibosan and the fact that it is stable in solution and can be given intramuscularly without causing damage to the tissues indicates that its introduction constitutes a distinct advance in the treatment of kala azar.

C M H

KIKUTH (Walter) & SCHMIDT (Hans) Contribution to the Progress of Antimony Therapy of Kala Azar.—*Chinese Med J* 1937 Sept. Vol. 52. No 3 pp 425-432. [25 refs.]

The authors give an interesting account of the introduction of the European hamster as an experimental animal for the testing of leishmanicidal drugs. The hamster inoculated intraperitoneally with heavily infected liver or spleen emulsion from another animal invariably becomes infected. In three months the infection is sufficiently heavy to commence a test. Usually drugs are given subcutaneously twice a week for five weeks the infection being controlled by liver puncture and serological tests. In this way solustibosan was arrived at which is characterized by its low toxicity allowing larger quantities of antimony to be administered in this form than in the usual pentavalent organic antimony compounds such as neostibosan neostam urea stibamine, etc. C M IV

LE HULUDUT Difficultés de traitement du kala-azar Indien. Premiers essais de l'anthiomaline. [Difficulty of Treatment of Indian Kala Azar First Trials with Anthiomaline]—*Rev Méd et Hyg Trop* 1937 Mar-Apr Vol. 29 No 2 pp 73-84 With 3 charts.

The author has treated seven cases of Indian kala azar with anthiomaline and has obtained satisfactory results. He says he was led to try this remedy owing to the unsatisfactory character of the treatment usually employed for this disease in India. He bases this statement on the opinions expressed in papers many years old and does not appear to be aware of the very excellent results which have been obtained in recent years by the use of neostibosan and similar drugs. C M IV

TARTAGLIA (Peter) La leishmaniose canine à Split [Canine Kala Azar at Split.]—*Bull Office Internat d'Hyg Publique* 1937 Sept Vol 29 No 9 pp 1927-1930 With 1 map.

Writing of kala azar on the coast of Yugoslavia, it is noted that the canine disease is present in Split to the extent of 7 to 8 per cent of the animals examined. These do not show any clinical signs of the disease. The human cases are more commonly found in the villages than in the towns and wherever they occur the presence of the sandfly *Phlebotomus major* has been demonstrated. C M IV

LEE (C. U) Canine Leishmaniasis in Peiping. A Preliminary Communication.—*Chinese Med J* 1937 June. Vol. 51 No 6. pp 951-952

The author records the presence of canine kala azar in Peiping. One case was in a stray the only animal found infected in 90 examined. The other case was in a carefully guarded house-dog which was associated with a child suffering from the disease. C M W

HOVNANIAN (Philipp) JEBEJIAN (Robert) & YENIKOMSHIAN (H A)  
**Dermal Leishmaniasis in a Newly Inhabited Section of Aleppo —**  
*Trans Roy Soc Trop Med & Hyg* 1937 July 31 Vol 31  
 No 2 pp 191-198 With 5 figs. (3 on 1 plate)

For 10 or more years a group of refugee immigrants had occupied a camp in Aleppo. They were then moved to a new site on which were being constructed houses built of mud and straw bricks. The new site was originally an orchard and when the first refugees moved there it was only partially cleared. Sandflies abounded and within two months cases of oriental sore began to appear. Within a year the disease had appeared in 45 of 127 families which had moved there. The infected families comprised 181 individuals of which 78 were attacked and of these 55 were children below 12 years of age. Seven persons acquired oriental sore for a second time there being in them evidence of previous infection in the shape of the characteristic scars and a history of having had Aleppo sore in the past. These second attacks were mild in character and of short duration. Practically all the cases occurred amongst those who came to the new site in the summer and autumn of 1935. With the completion of the building and the clearing of the site sandflies became less numerous and the new cases of infection were reduced to a low level. C M II

POGGI (Igino) Il bottone d'oriente (Ghesoà) nell'Agamé (Tigràl Orientale) [Oriental Sore in Agamé (Abyssinia)]—*Arch Ital Sci Med Colon e Parassit* 1937 Mar Vol. 18 No 3 pp 131-137 With 5 figs.

The author records the presence of oriental sore amongst the population of Agamé in Abyssinia and describes and illustrates a number of typical cases. C M IV

BOGLIOLO (Luigi) Studi sulle leishmaniosi. IV. Sull'istologia patologica della leishmaniosi cutanea (da *L. tropica*). Con alcune considerazioni sopra i rapporti fra leishmanie e cellule del sistema reticolo istiocitario [Histo-pathology of Cutaneous Leishmaniasis]—*Riv di Parassit* Rome, 1937 July Vol. 1 No 3 pp 221-258 With 8 figs [50 refs] English summary (5 lines)

The paper describes in detail the histology of the lesions in six cases of oriental sore studied in Italy. It is impossible to summarize the results but it may be pointed out that the author concludes that the granuloma caused by *Leishmania tropica* is at times indistinguishable from tuberculous lesions of the skin or from tuberculoids.

C M IV

GONZALEZ (Gustavo) & OLIVERA Y SILVA (N) La leishmaniosis forestal americana en la guerra del Chaco [Forestal American Leishmaniasis in the Chaco War]—*Da Reunión Soc Argentina Patol Regional Mendoza* 1 2 3 y 4 octubre 1935 Vol 2. pp 959-974 With 14 figs (1 folding map)

This is a general account of cutaneous leishmaniasis which occurred in epidemic form in the Chaco district of Paraguay during the



disturbances brought about by the recent war. The distribution of the cases is illustrated on a map and the varied character of the lesions is shown in a series of photographs. C M IV

GONZALEZ (Gustavo) BOGGINO (Juan) & RIVAROLA (Juan B.) Linfangitis y adenopatías en las lesiones cutáneas de la leishmaniasis americana. [Lymphangitis and Adenitis in Cutaneous Leishmaniasis of S. America.]—*9a Reunión Soc Argentina Patol. Regional Mendoza* 1 2 3 y 4 octubre 1935 Vol 2 pp 753-771 With 14 figs [38 refs.]

The occurrence of lymphangitis in connexion with cutaneous leishmaniasis has been noted by many observers, whose records are reviewed by the authors in this paper. They note that amongst cases of this disease seen by them in Paraguay about 12 per cent show evidence of involvement of the lymphatics draining the region of the sore. In connexion with this lymphangitis there is enlargement of the nodes which have been studied histologically. The enlargement is due to proliferation of the reticulo-endothelial system together with giant cell formation. The constant presence of leishmania proves that the lymphangitis is definitely due to these organisms which have reached the nodes as infarcts from the skin lesion.

C M IV

DEANE (L) & DEANE (G) Estudos sobre a leishmaniose visceral americana. Nota No 1 Aspectos clinicos da doença. Nota No 2. Sobre o valor da reacção do formol-gel no diagnostico da leishmaniose visceral americana. [Studies on S. American Kala Azar 1 Clinical Aspects. 2. Diagnostic Value of Formol-Gel Test.]—*Hospital Rio de Janeiro*. 1937 Aug Vol 12 No 2 pp 189-199 With 5 figs pp 201-202

CHAGAS has reported that in carrying out the formol-gel test in a case of S. American kala azar a positive result was obtained in four minutes. A number of cases of other diseases tested had given no positive reading in an hour. The authors of the present paper have similarly tested four cases of S. American kala azar and obtained a positive reaction in all, the longest time being four and a half minutes. In 217 cases of other diseases and 12 normal individuals the test was sometimes positive the shortest time being 11 minutes. In the majority of cases the time was an hour or more or the reaction was quite negative.

C M IV

YOUNG (A. Greville) Oriental Sore simulating Leprosy.—*India Med Gaz.* 1937 July Vol 72 No 7 pp 421-422 With 1 fig

The case described is that of a Brahmin woman who had five purple coloured nodules on the left arm and three on the right. The five nodules were in an area of skin of about five or six square inches. As the skin was anaesthetic between the nodules the case was treated as leprosy for three months. Finally oriental sore being suspected leishmania were discovered. Application of tartar emetic ointment was followed by sloughing and complete healing in fifteen days.

C M IV

GASPERINI (G. C.) Un caso di leishmaniosi delle mucose messo in evidenza dai fenomeni allergici provocati. [A Case of Leishmaniasis revealed by the Allergic Phenomena provoked.]—*Arch Ital Sci Med Colon e Parassit* 1937 July Vol 18 No 7 pp 430-432

Having under observation a case of ulceration of the outer and inner surfaces of the lip the author suspected its leishmanial nature but could obtain no positive serological reaction. However the injection into the skin of the deltoid of an antigen prepared from cultures of *Leishmania donovani* produced an area of oedema developing into an indurated papule which did not subside for about eight days. At the same time the axillary glands became swollen and painful. It is concluded that this was a positive response and gave evidence of the character of the sore.

C M IV

RAYMOND (R. L.) CRUICKSHANK (M. M.) RAYMOND (R. L.) Clinical Study of Sixty-Three Cases of Oriental Sore. [Correspondence.]—*Indian Med Gaz* 1937 June & Aug Vol 72. Nos 6 & 8 pp 390 518-519

In commenting on the paper by GOODALL (this *Bulletin* 1937 Vol 34 p 576) the writer of the first letter states that his experience in Quetta showed that the usual antimony and berberine treatments of oriental sore were unsatisfactory and that the best results were obtained by thoroughly scraping the sore under gas anaesthesia applying pure carbolic acid and covering directly with elastoplast or ordinary adhesive plaster the whole being then well bandaged. The plaster is left *in situ* for 14 days when it is removed in about 90 per cent of cases it will be found that complete healing has occurred. In the unhealed 10 per cent the plaster is again applied and left for a further 14 days. In a few cases a second scraping will be necessary. It is claimed that the Quetta experience shows that this treatment is the method of choice. This letter called forth an editorial comment that the statement was based on clinical impressions and that the advantage of the treatment could not be regarded as a clinical fact as precise comparative tests had not been made. The letters in the later number of the *Gazette* give further testimonies in favour of the treatment and reveal an unrepentant editor who still argues in favour of the clinical impression idea as against that of the clinical fact.

C M IV

HOLMES (F.) Mass Treatment of Oriental Sores—*Jl Roy Army Med Corps* 1937 Oct. Vol. 69 No 4 pp 258-260

After the earthquake in Quetta in 1936 conditions became very favourable for the breeding of sandflies with the result that numerous cases of oriental sore occurred amongst the British and Indian troops, as also amongst dogs. Various treatments were tried till finally the mass infections were dealt with by thorough scraping of the sore under gas anaesthesia followed by the application of pure carbolic acid and a cover of elastoplast. The cover is left in position for two weeks. If it comes off it is renewed. Trivalent antimony compounds either alone or in combination with the scraping treatment, were effective. Pentavalent antimony compounds were less satisfactory. C M IV

## MALARIA

MORIN (H G S) & MOREAU (P) Sur les possibilités d'utilisation des poissons à la lutte contre le paludisme en Indochine. [Utility of Fish in Anti Malaria Work in Indo-China.]—*Arch Inst Pasteur Indochine* 1938 Oct Vol 6 No. 24 pp 485-505 With 1 plate [100 refs.]

The papers which precede this contribution in this number of the *Archives* also deal exclusively with the possible utilization of fish as a contribution to antimalaria work in Indo-China. There is a general discussion of the subject and an account of the results achieved in different parts of the world, notably in Java. An account is given of experiments carried out in Indo-China with *Girardinus guppyi* (millions) and *Gambusia affinis*. A list is given of the indigenous fish collected by the Anti-Malaria Services of the Pasteur Institutes of Indo-China and a key for the identification of local species of freshwater fish. There is also a zoological description of those species that are likely to be of service in anti-malaria work. The paper under review sums up the question from a practical point of view. In the north of Indo-China, Tonking and Northern Annam the season when anti-larval measures are most important is the season when the larvicidal propensities of fish are at a low ebb. Here any attempts at stocking collections of water with fish should be concerned mainly with larger omnivorous varieties which might be a valuable addition to the local food supplies of a poor population. In the centre and in the south of Annam however the use of small larvicidal fish promises to be of great utility. Here *Girardinus* is readily acclimatized and here too the indigenous *Macropodus opercularis* introduced into a small marsh together with an aquatic plant, *Pistia stratiota* succeeded in eliminating *A. minimus* larvae which had been very numerous. There seems to be no doubt that *Gambusia* will likewise thrive in this part of the country. The authors stress the importance of instructing the native population, especially the children regarding the useful rôle that these fish are expected to play otherwise the fish are little likely to survive.

Norman White

LE ROY (G) Un cas de paludisme pernicieux simulant la méningite cérébro-spinale [Case of Pernicious Malaria simulating Cerebro-spinal Meningitis.]—*Bull Soc Path Exot* 1937 Oct 13. Vol. 30. No 8 pp 664-671 [22 refs.]

A young man was admitted to hospital in Tunis as a case of cerebro-spinal meningitis. He had had 52 months service in Tunis but had never suffered from malaria. He presented all the characteristic symptoms and signs of that disease except herpes erythema and a polynuclear leucocytosis. The intrathecal injection of serum that was administered certainly appeared justified. An examination of the spinal fluid collected on the day of admission negatived this diagnosis. The fluid was practically normal. The patient grew rapidly worse and there appeared to be no hope of his recovery when on the eighth day a very heavy *falciparum* infection was discovered. Quinine

treatment and complete recovery followed. Full details of this instructive case are given and reference is made to similar cases reported in the literature

N IV

ROGER (H.) & BOUDOURESQUES (J) A propos d'un cas de polynévrite paludéenne [Case of Malarial Polyn neuritis].—*Bull Soc Path Exot* 1937 Oct. 13 Vol. 30 No 8. pp 671-675

In times gone by cases of polyn neuritis were not infrequently ascribed to malaria. In many of these alcohol or beriberi or even dysentery was responsible for the condition. The authors assert that genuine cases of malarial polyn neuritis do occur though they are rare. One such case is described that of a young married woman who during three years in Morocco had suffered from repeated attacks of malignant tertian malaria. The onset of neuritic symptoms occurred during one of these febrile attacks paraplegia became complete. Alcoholism, venereal disease and beriberi could all be excluded as aetiological factors. The parasite could always be demonstrated in the peripheral blood during any exacerbation of the symptoms. The administration of antimalarial drugs resulted in complete cure though convalescence was very protracted.

N IV

FARINAUD (E.) & MOREAU (P) Etat actuel de la prophylaxie du paludisme par médicaments synthétiques en Indochine ses indications ses limites [Present State of the Prevention of Malaria in Indo-China by Administration of Synthetic Drugs Indications for their Use, their Limitations].—*Bull Soc Méd-Chirurg Indochine* 1937 June-July Vol. 15 No 6 pp 567-582.

Malaria is hyperendemic in a great part of Indo-China. Cases are most numerous at the beginning and end of the rains July August and September and again from December to March inclusive. In practice this amounts to an almost unbroken period of active transmission from July to March. There are places indeed where *A. minimus* by far the most important vector breeds throughout the year and where the infant endemic index remains constantly above 60 per cent. In such circumstances as these though the prophylactic use of synthetic drugs confers great benefits such benefits are very temporary and are lost completely within two months of the cessation of this prophylactic treatment. Almost continuous treatment is neither practicable nor desirable. In such hyperendemic areas antilarval measures are indispensable if these be based on a thorough study of the local problem a more limited use of synthetic remedies is a valuable aid to successful results. There are a few areas of moderate endemicity with a marked and limited seasonal prevalence of the disease, in which the use of synthetic remedies as the sole measure of prophylaxis has given good and lasting results.

N IV

MARNEFFE (H.) Un essai de prophylaxie du paludisme par les médicaments synthétiques chez l'enfant. [Prevention of Malaria by Administration of Synthetic Remedies to Children].—*Bull Soc. Méd-Chirurg Indochine* 1937 June-July Vol. 15 No 6 pp 582-589 With 5 charts.

This attempt at prophylaxis was carried out in an Annamite village where, among children from 2 to 15 years of age the splenic index

was 66.6 per cent., the parasite index 69.8 and the gamete index 52.1 per cent. *A. minimus* and *A. greggii* are the local vectors. The children were divided into four groups. The first group were all infected after a curative treatment with quinacrine and praquine they were given a dose of quinacrine each Monday and Thursday. In the second group quinacrine was replaced by quinine the prophylactic follow up treatment being given every day except Sundays. The third and fourth groups consisted of children apparently not infected. The children in the third group received quinine every day except Sundays those in the fourth group quinacrine each Monday and Thursday. The original intention was to continue the experiment throughout a year it lasted but seven weeks. The Sister in charge of the experiment fell ill. The author concludes from this limited experiment that treatment with quinacrine and praquine causes an immediate drop of parasite and gamete indices that quinacrine is superior to quinine in this respect and that the follow up treatment with quinacrine or quinine though capable of keeping these indices at a low level for some weeks does not prevent them gradually attaining their former levels. A II

GOSIO (R.) *Sondaggio di contrattilità della splenomegalia malarica e trattamento adrenalico dello stato malarico* [Measurement of the Contractibility of the Enlarged Spleen of Malaria and the Adrenalin Treatment of Chronic Malaria].—*Riv di Malariologia* Sez. I 1937 Vol. 16, No. 2 pp 123-141 With 2 plates German summary [25 refs]

The author describes the radioscopic technique that has enabled him to determine the persistence and measure the degree of the contraction of the malarial enlarged spleen resulting from adrenalin treatment. With regard to diminution in the size of the spleen the contraction of the organ which follows immediately the injection of a single dose of the drug, and which is temporary must be distinguished from the permanent decrease in bulk that is brought about by a series of intravenous injections. The degree of the former gives some indication of the probable results of this form of treatment. The paper contains a full and interesting discussion of ASCOLI's method of treatment and its *modus operandi*. The author considers it to be specific in the treatment of the *stato malarico*. A II

WATSON (Robert B.) & SPAIN (E. L.) Jr *Studies on Malaria in the Tennessee Valley The Influence of Physiography on the Occurrence of Breeding Places of Anopheles quadrimaculatus in Northern Alabama*.—*Amer J Trop Med* 1937 Mar Vol. 17 No. 2 pp 289-305. With 5 figs (2 maps)

A description of the physiography of northern Alabama and of the natural breeding places of *A. quadrimaculatus* is followed by a short discussion of the probable effect of impounding the water of the Tennessee on the prevalence of this anopheline. The opinion is expressed that malaria transmission will be lessened rather than increased, by the creation of the lakes, provided that modern antilarval measures are carried out throughout the breeding season.

N II

SEX (P) The Relative Prevalence of Anophelines in Houses and Cattle-Sheds in Delta Bengal.—*Records of the Malaria Survey of India* 1937 June-Sept. Vol 7 Nos 2 & 3 pp 147-153  
With 2 charts

This is a study of the diurnal resting places of anophelines in villages on both banks of the Hooghly downstream from Calcutta. It is based on the capture of 15 453 anophelines throughout a year. The number of the different species caught in the year per ten standardized catches a month and the relative prevalence of each species per cent in houses and cattle sheds were as follows —

	Houses		Cattle Shed	
	No Caught	Percent of Total	No Caught	Percent of Total
<i>A. barbitrostris</i>	62	6.2	104	7.7
<i>A. hyrcanus</i>	83	8.4	246	18.3
<i>A. subpictus</i>	171	17.3	294	21.9
<i>A. vagus</i>	263	26.6	220	16.4
<i>A. sundascus</i>	97	9.8	74	5.5
<i>A. annularis</i>	263	26.4	329	24.5
<i>A. philippinensis</i>	7	0.7	4	0.39
<i>A. ramsayi</i>	11	1.1	26	1.9
<i>A. varuna</i>	13	1.3	25	1.86
<i>A. aconitus</i>	18	1.8	21	1.5
<i>A. culicifacies</i>	1	0.1	1	0.09

N II

MOSNA (Ezio) Sulle caratteristiche termiche dei focolai di *Anopheles maculipennis* [Temperature and Development of *A. maculipennis*].—*Riv di Parassit* Rome. 1937 Apr Vol. 1 No 2. pp 139-155 With 1 fig & 1 graph English summary (9 lines)

The paper describes laboratory experiments carried out under controlled conditions of temperature and devised to give precise information about the rate of development of the early stages of two races of *Anopheles maculipennis*.

The larvae were reared in dishes in a thermostat the temperature of the water in the bath being recorded continually. [As the dishes were covered one may assume that evaporation did not occur so that probably the temperature of the dishes and of the water bath are identical.] One series was run at constant temperature and the other at temperatures which fluctuated between definite limits and the mortality was recorded in all experiments.

At a constant temperature larval life of *labranchiae* was 9 days at 30°C no deaths occurring. At 32° and 35°C. some larvae became pupae but none of them reached the adult stage though in nature larvae must be exposed to temperatures at least as high as this for a few hours at a time. Under the same conditions the larval life of *atroparvus* was one day less at each temperature and again none survived to the adult stage at 35°C. A few minor differences between the races are recorded, but as apparently no experiment was repeated it does not seem necessary to attribute much importance to them.

The paper also describes experiments in which the temperature of the thermostat ranged between two fixed points during the day. For instance at 20-30°C. the length of life of the larva of *labranchias* was ten days, the mortality being very slight. The experiments give approximate information about the temperature whether constant or fluctuating which is optimum for these larvae. They are valuable because they were carried out with care and fully recorded.

P. A. Buxton

POLEZHAEV (N. G.) L. influence de la lumière sur la distribution des *Anopheles maculipennis* dans les abris de jour [The Effect of Light on the Distribution of *A. maculipennis* in Day-time Shelters.] —*Med. Parasitol. Moscow* 1936. (vol. 5 No. 4 pp. 544-548. With 2 figs. [In Russian. French summary.] [Summarized in *Rev. Applied Entom.* Ser. B 1937 June. Vol. 25 Pt. 6. pp. 142-143.]

"The distribution of *Anopheles maculipennis* Mg. in day time shelters was studied in a village in the environs of Perm. Cow-sheds and stables were examined and in each case the temperature, humidity and intensity of light in the four corners and in the centre were measured. The weather was wet, and in the sheds and stables, the humidity was high, the mean temperature varied little and there were practically no draughts. The intensity of light was, therefore, the decisive factor that affected the distribution of the mosquitos. They always occurred in the upper parts of the sheds, but were evenly distributed if the light was evenly diffused, whereas if it was not most of them congregated in dark places, this being due to photokinesis. In some cases, however, this inverse correlation with light intensity was broken owing to the presence of animals to which the mosquitos were attracted, or to cracks in the walls, which they avoided. A table shows how the average numbers of mosquitos decreased regularly with an increase in the intensity of light, which varied from 0.15 to 185 lux."

GIL COLLADO (J.) La distribución geográfica de las variedades de *Anopheles maculipennis* en España, con breves consideraciones acerca de su biología. [Geographical Distribution of *A. maculipennis* in Spain.] —*Rev. de Malaria* Ser. I 1937 Vol. 16. No. 4 pp. 278-299. With 1 map.

The examination of the eggs laid by some four thousand mosquitos caught in all parts of Spain has enabled the author to map out the distribution of the varieties of *A. maculipennis* that are found in that country. Four varieties are met with: *basilis* (typicus), *melanocephalus*, *labranchias* and *atroparvus*. *A. maculipennis* var. *typicus* was found only in one village in the north-west, near the northern frontier of Portugal. The *melanocephalus* variety was only found near rice fields along the east coast of the country. It is responsible for little or no malaria. The variety *labranchias* is restricted to the south-east corner of the country where it is an efficient vector of malaria, sometimes in epidemic form. The only widespread variety is *atroparvus*. It is found throughout the country and in very diverse conditions as regards

climate and physical features. It prevails in places of high endemicity and places in which there is no malaria at all. The author discusses at some length the factors which may be responsible for its inefficiency as a vector in certain conditions. A II

BATES (Marston) The Seasonal Distribution of Anopheline Mosquitoes in the Vicinity of Tirana, Albania.—*Riv di Malariologia* Sez. I 1937 Vol. 16 No 4 pp 253-264 With 12 figs

The results of weekly catches of mosquitoes in two stables near Tirana Albania, during four years are reported. The *Anopheles* found are *maculipennis* (*typicus* and *subalpinus*) *sacharovi* *superpictus* *claviger* *plumbeus* and *algeriensis*. The last two are rare. The *maculipennis* curve covers the same period each year. There is an increase in the spring the peak of the curve is at the beginning of July and thereafter a rapid fall. The curve is of single mode. The big summer increase of *maculipennis* concerns *typicus* only. *subalpinus* prevalence remains at a low and fairly constant level throughout the summer. *sacharovi* appears early in July and declines in numbers gradually through August and September. The curves for *superpictus* vary from year to year. The species breeds in pools in the river bed the floods which come down the river are very irregular. A dry summer favours *superpictus*. There is a tendency for the curve of prevalence to show a low spring peak early in May and a much larger peak in August. The *claviger* curves show a small spring peak and a very abrupt and large rise in the first or second week of November this was constant. A II

FENG (Lan-Chou) & CHIN (Yao-T'ing) The Presence of *Anopheles maculipennis* in Certain Parts of Manchuria.—*Chinese Med J* 1937 Apr Vol. 51 No 4 pp. 496-499 With 5 figs. on 1 plate. [12 refs.]

The finding of *A. maculipennis* in Heilungkiang North Manchuria is interesting. It is reported in this paper for the first time. The male terminalia of the single specimen available have led the authors to believe that the variety is *atroparvus*. It remains to be seen whether this species or *hyrcanus* which is also present, is responsible for the high incidence of malaria in certain localities in North Manchuria. A II

YAO (Y. T.) & LING (L. C.) Study of Mosquito Fauna in Southwestern China especially in the Provinces of Kweichow and Yunnan. Part I. Tribe Anophellini.—*Japanese J. Experim. Med* 1937 Apr 20 Vol. 15 No 2. pp 121-136 With 1 map [33 refs.]

Fifteen species of *Anopheles* have been found in Yunnan Kweichow and adjacent parts of Szechuan and Kwangsi. Of these *A. annularis* var. *adisi* and *A. philippinensis* both of which were found in Yunnan have not been reported from other parts of China. A II



- SAUTET (J) Contribution à l'étude de l'exophilie de l'*Anopheles maculipennis labranchiae* et de l'*Anopheles zschaverovi* dans ses rapports avec la transmission du paludisme [Exophilla of *A. maculipennis labranchiae* and *A. zschaverovi* and its Relationship to the Transmission of Malaria.]—*Bull. Soc. Path. Exot.* 1937 May 12. Vol. 30 No 5 pp 387-392 With 3 figs.

Exophilla, or preference for an outdoor existence, appears to characterize both *A. maculipennis labranchiae* and *A. alatus* in Cordoba in the hot weather though both species appear to be essentially domestic or entophilous elsewhere. Holes in the trunks of cork oak-trees were much favoured as diurnal shelters. Here the numbers greatly exceeded the numbers caught in a nearby stable when the weather was calm in windy weather the reverse was noted. The females captured in outdoor resting places were gorged in about the same proportion as those captured in the stable. The author believes that malaria is more commonly contracted in the open air than is commonly supposed.

V IV

- BEVAN (C E) Notes on the Distribution and Breeding-Places of Mosquitoes in Northern Abyssinia.—*Bull. Entom. Res.* 1937 July Vol 28 Pt 2 pp 279-287 With 1 text fig (map) & 3 figs on 1 plate.

Conditions inseparable from service with an ambulance in war time in difficult country are not congenial to research. In four places the ambulance remained long enough to allow mosquitoes to be bred from larvae. Fifty-five such mosquitoes and six caught as adults, were sent to the Imperial Institute of Entomology and identified by Dr F W Edwards. They included seven species—*Culex andersoni*, *Culex theileri*, *Aedes quasimaculatus*, *Anopheles cinereus*, *Anopheles christyi*, *Anopheles gambiae* and *Culex annulirostris*. The last four have not previously been recorded from Abyssinia. All the breeding places were from 6 000 to 9 000 feet above sea level. Attached to the report is a list of mosquitoes that have been reported from Abyssinia.

N IV

- GASCHEN (H) & RAYNAL (J) Recherches sur les affinités trophiques des anophèles d'Indochine. Deuxième note. *Anopheles vagus*, *A. minimus*, *A. jayponensis* et *A. aconitus*. [Feeding Preferences of the Anophellines of Indo-China.]—*Ann. Inst. Pasteur* 1937 July Vol 59 No 1 pp 57-63 With 4 charts & 4 figs. [24 refs.]

The first part of this paper was concerned with *A. sinensis* (this Bulletin 1937 Vol 34 p 164). The observations now reported are concerned with *A. vagus*, *A. minimus*, *A. jayponensis* and *A. aconitus*. *A. vagus* is a multidentate species. In the 1028 examined the number of maxillary teeth varied between 12 and 18 mean 14.1. Comparison with observations in past years indicates that this mean maxillary index in Tonking is stable. Most of the indexes below 14 were found in mosquitoes captured near the sea coast indicating the possible existence of races adapted to salt water. In no case did precipitin reactions reveal human blood in *A. vagus* though more than 750 of those examined were caught in human habitations. The species

is thus very definitely zoophile in Indo-China. Buffaloes and bullocks especially the former are most favoured as sources of blood

*A. minimus* and *A. jeyporiensis* two of the most important vectors of malaria in Indo-China are both paucidentate the mean maxillary index of 494 *A. minimus* was 11.6 (only 1.2 per cent. 14 or over) and of 501 *A. jeyporiensis* 12.0 (3.4 per cent. 14 or over). The index varies very little from place to place. Human blood was found in 59.6 per cent. of *A. minimus* and in 51.2 per cent. of *A. jeyporiensis*. Both species are thus anthropophile. In the absence of human blood both species feed on bullocks and buffaloes *A. jeyporiensis* being more readily deviated toward these animals than *A. minimus*. The position of stables in agricultural communities in Tonking is of importance in securing this protective deviation.

*A. aconitus* although paucidentate is to a very marked degree zoophile. The mean maxillary index was found to be 11.2 (501 examined) and 94.2 per cent. contained animal blood as compared with only 2.3 per cent. with human blood. The authors consider that their results are invalidated to some extent by the fact that 422 of the mosquitoes were captured in an agricultural concession where cattle stables are very abundant and where even *minimus* and *jeyporiensis* are deviated towards animals to some extent. Even so its zoophile tendencies are marked though in some parts of Tonking anthropophile tendencies are sufficiently in evidence to make it a not negligible vector of malaria.

N IV

KIRK (J Balfour) The Relation of Shade to the Natural Breeding Places of *Anopheles costalis* in Mauritius.—*Ann Trop Med & Parasit* 1937 Apr 8. Vol 31 No 1 pp 1-6 With 1 plate

Rivers and watercourses in Mauritius are periodically liable to flooding. For this reason ground on either side of watercourses is reserved and exploited by a government River Reserves Board. These reserves have been long kept planted with trees with the primary object of preventing erosion. The belt of shade on each side of the watercourses is also beneficial inasmuch as *A. gambiae* Giles (*costalis* auct.) the principal vector of malaria does not breed in shaded water in Mauritius. *A. funestus* which is also prevalent in Mauritius breeds in densely shaded waters but fortunately this species plays no important part in the spread of malaria in the Island. N II

GEBERT (S) Notes on the Viability of *Anopheles costalis* Ova subjected to Natural Desiccation.—*Trans Roy Soc Trop Med & Hyg* 1937 June 25 Vol 31 No 1 pp 115-117

How long can the eggs of *Anopheles gambiae* [called by its synonym *costalis* in the title] survive after they are exposed under natural conditions on a surface of concrete or mud which is drained and allowed to become dry?

In the majority of the experiments eggs were collected in nature and transferred to small concrete basins which were drained and then left in the open for one or more days. They were then refilled with water and a record made of the number of eggs which hatched. It was found that at least a quarter of the eggs could hatch when the basin had been apparently dry for 24-48 hours few could hatch after 72 hours none

after longer exposures. The author points out that it has been the custom in Mauritius to prevent breeding in tanks etc. in gardens by emptying them and refilling them a few hours later but his experiments indicate that a period of 4 days is necessary if any eggs which may be in the water are to be destroyed. The point is important because the great majority of the breeding places of *A. gambiae* in Mauritius are artificial pools and tanks in gardens.

P A Burton

DE MEILLON (Botha) A Cage Colony of *Anopheles gambiae* Giles.  
[Correspondence]—*Nature* 1937 Sept 4 Vol. 140. No. 3540 p 428.

The author has frequently tried to maintain *A. gambiae* in culture in the laboratory but has failed generally because caged adults would not feed either on man or animals. He has now been successful making use of a large cage heated to about 25°C. and offering the insects a small pig as food. The third laboratory generation had been bred at the time when the note was written.

P A Burton

KOSTITCH (D) *Anopheles* Mosquitoes in Yugoslavia and their Zoophilism.—*Ann Trop Med & Parasit* 1937 Apr 8. Vol. 31 No 1 pp. 15-22. [15 refs.]

Five species of *Anopheles* are found in Yugoslavia *maculipennis*, *superpictus*, *bifurcatus*, *hyrcanus* and *plumbeus*. *A. maculipennis* is the most important vector of malaria and *superpictus* also plays an important part. The only two varieties of *maculipennis* found are *messasi* and *typicus*. In southern Yugoslavia anophelism without malaria has never been observed and *A. maculipennis* var. *messasi* never exhibits such leanings towards exclusive zoophilism as it does in other parts of Europe. During 1935 precipitin tests were carried out on the stomach contents of 812 anophelines, viz *maculipennis*, 305 caught in stables 210 in houses and *superpictus* 107 caught in stables, 100 in houses. Of the stable *maculipennis* 15.4 per cent had fed on human blood 78.7 on animal blood and 7.9 per cent on both human and animal blood. Of *maculipennis* caught in houses 45.6 per cent. contained human blood, 40.8 animal blood and 13.6 per cent. both human and animal blood. Of *superpictus* caught in stables 42.9 per cent contained human blood 44.7 animal blood and 12.4 per cent both human and animal blood. Of *superpictus* caught in houses 48.1 per cent contained human blood, 21.5 animal blood and 34.4 per cent. both human and animal blood (totalling 104 per cent.). These anophelines have been observed to bite even when their stomachs are distended this greediness is thought to explain the large number of anophelines found containing both human and animal blood.

N IV

POKROVSKI (S. N.) & POLIKARPOVA (L. I.) The Transportation of Malarial Mosquitoes into Stalingrad and Astrakhan on Local River Steamers.—*Med Parasit. & Parasitic Dis* Moscow 1937 Vol. 6 No 2 [In Russian pp. 224-230 With 3 figs. English summary p 230.]

"Daily collections of mosquitoes on small steamboats and on large steamboats show that these vessels, especially the large ones, transport a considerable number of *Anopheles maculipennis* into the city of Astrakhan

from different parts of the Volga delta This fact undoubtedly has epidemiological significance

The city of Stalingrad also suffers from the same incessant ingress of malarial mosquitoes on steamers from the Volga basin.

BOYD (Mark F) & KITCHEN (S F) A Further Note on the Infectiousness of Anopheline Mosquitoes Infected with *P vivax* and *P falciparum*—*Amer J Trop Med* 1937 Mar Vol 17 No 2 pp 245-251

The observations recorded in this paper were made in the authors malaria therapy service and have much epidemiological interest *P vivax* is used in the treatment of white patients *falciparum* in the treatment of negroes the behaviour of *vivax* and *falciparum* presents interesting points of dissimilarity Infective mosquitoes were classified as poor fair and good according to the number of cysts per positive stomach in the different lots poor having less than 30 good more than 50 in half of them In the case of *vivax* the percentage of positive takes was 80.8 84.8 and 92.8 with poor fair and good lots respectively With *falciparum* these percentages were 66.6 61.8 and 44.4 It would appear that in the case of *falciparum* if much space on the stomach wall be occupied by cysts the mosquito will not mature as many infectious sporozoites as will a lightly infected mosquito This is certainly not the case with *vivax* The likelihood of a successful inoculation with *vivax* in white patients increases with the number of sporozoites inoculated. The minimal infecting dose of *falciparum* sporozoites in negroes is small less than the number of sporozoites usually inoculated by a single mosquito with an average infection. No patients were infected with *vivax* sporozoites after more than 50 days storage of the mosquitoes in the frigidaire after the first detection of sporozoites in the salivary glands in the case of *falciparum* there were no infections after 30 days such storage. The best results were obtained with *vivax* sporozoites less than twenty days old and with *falciparum* sporozoites less than ten days old N IV

PAPADAKIS (A. M.) Researches on the Biology of *A superpictus* in Northern Peloponnesus for March to October 1934—*Iatr Athen* [Med. Athens] Nos. 89-90 Reprint 22 pp 1936 Athens [In Greek.] [Summarized in *Rev Applied Entom* Ser B 1937 June. Vol. 25 Pt 6 pp 147-148.]

An account is given of an investigation undertaken from March to October 1934 in a town and 16 villages in northern Peloponnesus on the biology of *Anopheles superpictus* Grassi which is the chief malaria vector of the region

The overwintered females oviposited during the first half of April the first eggs were found in nature on the 7th the first young larvae on the 20th and adults of the first generation at the beginning of May The average number of eggs in a batch during the whole period was 112 but during the period of greatest egg production (15th June-15th September) it was 128 The numbers of eggs decreased after 15th September and no oviposition was observed in October At the beginning of the season the larvae were usually found only in low lying breeding places whereas when the weather became warmer they occurred at higher levels. During August and September they were ubiquitous but were more prevalent in torrents in the hills than in breeding places on the plain. Larvae from the higher situations

were more resistant than the others to such factors as sun warmth, etc. and were more active both in nature and in the laboratory moreover they were not so easily or quickly killed when the water was dusted with Paris green. Paris green appears to have rather less effect on larvae of *A. superpictus* than on those of *A. maculipennis* Mg and *A. sackarovi* Fabr.

At the beginning of the season adults were found in houses and stables in lowland areas and later in those in higher situations. They were widely distributed in August and September but became less so in October when the temperature was falling. Observations in a mountainous village 1640 ft above sea level showed that twice as many females were caught in stables as in houses. They were taken in larger numbers in catching stations when animals or man had been present in them during the previous night. They did not seem to prefer man to animals and their abundance in buildings appeared to depend on the suitability of the shelter and the accessibility of a blood meal. It was found by means of precipitin tests that 44.7 per cent. of females caught in bedrooms contained human blood and 55.2 per cent. animal blood (horse and sheep) whereas all those in stables contained animal blood. The general malaria infection rate was 1.5 per cent in September and was a little higher in females taken in stables than in those taken in houses. The inhabitants of certain villages go with their animals to villages in the hills for two or three months during the hottest part of the year (August-September) and catches made in the empty houses and stables revealed only a few Anophelines although it is the season during which they are most prevalent. Far larger numbers were obtained when the inhabitants returned, although the temperature was beginning to fall (pre-hibernating period). Undoubtedly the presence of man and animals attracts the mosquitoes to a great extent. In villages in high situations *A. superpictus* was only prevalent for two months whereas in those on the plains or near the sea it was abundant for four. Although several catching stations of the same type were placed along the bank of a large torrent in only one were males of *A. superpictus* found in large numbers throughout the season. In this one the proportion of males to females was 5:1 when pigs were kept there overnight, the total number of mosquitoes was increased but males still predominated. This station appeared to be similar to the others and was at the same distance from the breeding places."

PAPADAKIS (A. M.) *The Biology of Anopheles superpictus* in Greece.—*Helleniatr* [Greek Med.] Vol. 10. Reprint 9 pp. 1936.  
Salonica. [In Greek.] [Summarized in *Rev. Applied Entom.* Ser. B. 1937. June. Vol. 25. Pt. 6. p. 148.]

From observations over a period of five years in different parts of Greece the author concludes that the breeding places of *Anopheles superpictus* Graess. can be divided into three main types chiefly according to soil conditions. The first type occurs in torrents and is characterised by having a rocky bottom on which there may or may not be vegetation. It is small and shallow with very clear water and is exposed to the sun although it may be partly shaded for a few hours. The second type occurs in the beds of large rivers and is characterised by having a sandy bottom. The water which is clear may be shallow or rather deep but is exposed to the sun throughout the day. Almost

always there is a thin layer or film of sand or dust floating on the surface. The third type occurs in streams or small torrents chiefly on hill sides and is characterised by a thick layer of mud on the bottom the water is very shallow and the vegetation if any is on the edges. The first type is the most common but the least favourable to the larvae the second type is the most favourable. The observations were verified in several hundred experimental breeding places made next to natural ones.

Observations have also been made on oviposition in nature and in experimental breeding places in the open and on larval development. The eggs were counted on the surface of the water by means of a hand lens without disturbing the breeding place. In the first and third types of breeding places the eggs were always found at the edges particularly where the surface of the water touched the soil. In the second type they were laid on the layer of dust or sand in the middle of the water surface rarely at the edges. In the last named type eggs were never found if the layer of dust or sand was absent moreover the layer must be thin for no oviposition took place where it was thick. In the rare cases where the breeding places contained vegetation the eggs were never deposited on it.

Thus the breeding places of *A. superpictus* appear to be small (in comparison with those of the other *Anopheles* of Greece) shallow and exposed to the sun for most of the day and the water is clear and not cold. In those of the second type there is also a layer of dust. The fact that this species is prevalent in Greece in the warm months (July September) would appear to show that it is favoured by sun and abundant daylight and it is suggested that it chooses small shallow sunlit collections of water for breeding because the water in them is uniformly warm. Its eggs which have no floats sink easily and this is thought to be the reason why they are laid either at the edges of the breeding places or on the layers of dust.

HU (Stephen M. K.) & YU (H.) Further Studies on the Blood Preferences of *Anopheles hyrcanus* var *sinensis* Wied. In Shanghai Region.—*Chinese Med J* 1937 May Vol. 51 No 5 pp 639-642.

It has previously been shown that practically all *A. sinensis* in the Shanghai region captured in houses had fed on human blood and those captured in a cow stable had fed on cow's blood. The present communication describes experiments in which two lots of 318 and 203 *A. sinensis* captured in houses were given an equal opportunity after four or five days fasting of feeding on man or a variety of domestic animals. They showed a marked preference for domestic animals more especially the cow and the goat. Only 6.9 and 8.2 per cent. of the 306 and 182 *Anopheles* that had fed were found to contain human blood. N IV

CHANG (T. L.) Maxillary Teeth of *Anopheles hyrcanus* var *sinensis* Wiedemann in Relation to Blood Preferences.—*Lingnan Sci J* 1937 July 22. Vol. 16 No 3 pp 435-438.

*A. sinensis* found in houses in the Kao-chiao area frequently contains human blood. It is nevertheless multidentate. The maxillary index of those found engorged with human blood 16.7 was not significantly different from that of those engorged with animal blood. N IV

WILLIAMSON (H. B.) & ZAIN (Mahomed) A Presumptive Culicine Host of the Human Malaria Parasites.—*Trans Roy Soc. Trop Med & Hyg* 1937 June 25 Vol. 31 No. 1 pp. 111-114 [14 refs.]

The conception that host efficiency is dependent upon environmentally determined biochemical factors led the authors to study the potentialities of *Culex bitaeniorhynchus* as a carrier of malaria. This culicine breeds in pure water its larvae are always found among *Spirogyra* on which they feed. Thirty laboratory-bred females were fed upon patients whose blood contained from 2.3 to 10.3 infective gametocytes per 100 leucocytes. Plasmodial cysts were found in 14 of the 29 cysts found 18 were pigmented. Eight of the 14 culicines with cysts had sporozoites in the salivary glands. Ross's black spores were found in five. Thirty-one unblooded laboratory-bred females used as controls showed nothing similar in some of them however sporozoite-like bodies were observed on the hind-guts, probably indicative of generalized protozoal infestations of tropical mosquitoes. The authors conclude that the developmental cycle of the two common malaria parasites and probably that of the quartan parasite also can proceed to completion in *C. bitaeniorhynchus* but in the absence of proof of the transmission of malaria by it no epidemiological conclusion is at present warranted N IV

KING (W. V.) On the Distribution of *Anopheles albimanus* and its Occurrence in the United States.—*Southern Med J* 1937 Sept Vol. 30 No. 9 pp. 943-945 [16 refs.]

- I. COVELL (G.) Anti-Mosquito Measures with Special Reference to India.—*Health Bull No 11 Malaria Bureau No 3* pp. ii + 60 Fourth Edition. 1935 Delhi Manager of Publications. [As. 4 or 5d.]
- II. — The Distribution of Anopheline Mosquitoes in India.—*Health Bull No 17 Malaria Bureau No 8* 43 pp. With 1 key map. Second Edition revised and brought up to date by I. M. PURI 1936 Delhi Manager of Publications. [As. 6 or 8d.]

1. The exhaustion of the third edition (this *Bulletin* 1935 Vol. 32, p. 441) of an extremely useful and practical pamphlet has afforded an opportunity of bringing the text up to date without appreciably increasing the size of a brochure which as was stated when reviewing the previous edition should be in the hands of every sanitarian in the tropics. From all conceivable standpoints those engaged in anti-mosquito campaigns or in the protection of others from mosquito attack will find the possession of this excellent booklet well worth while.

II. The first edition of this publication (see this *Bulletin* 1932, Vol. 29, p. 478) of which the value is indicated by the title gave the recorded distribution of Anopheline mosquitoes in India, Burma and Ceylon as known about the end of 1930. Since then, knowledge of the distribution of different species has been considerably amplified, and the information furnished in the edition under review reflects the state of the matter at the close of 1935 E. E. Austen

GORE (Ramkrishna N) An Improved Feather-Duster Mosquito Trap—*Records of the Malaria Survey of India* 1937 June-Sept Vol. 7 Nos 2 & 3 pp 209-211 With 6 figs.

The author has found a feather-duster of any dark shade inserted in an empty kerosene oil tin from which the top has been removed to be an efficient mosquito trap. He describes his method of using this simple contrivance.

A W

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have been killed with chloroform were combed from the cadavers of the wild rodents. They were transferred to physiological salt solution (in summer a 3 per cent salt solution is preferable in order to suppress bacterial growth) and shipped to the laboratory. As a rule, they were washed in sterile salt solution then ground in a mortar. The suspensions were injected subcutaneously into guinea pigs. Nothing very much seems to be known of the ability of different species of fleas caught on wild rodents to transmit plague to man. Their rôle in this type of transmission seems to be a subordinate one.

W F H

LAFFLE (Franz Xaver). Die Pest in Wien 1679 (Plague in Vienna in 1679).—*Arch. f. Hyg u. Bakt.* 1937 Oct Vol 119 No 1 pp 42-60 [20 refs.]

An account of one of the visitations of plague in olden days is always interesting for the side-light it throws upon the enormous change for the better in living conditions which has taken place with the passing of time. Vienna, situated upon the great Danubian highway from east to west, was for centuries a home of plague and the disease came to be known as the "Viennese death." Nor is there any wonder that a city of such size and importance subject to the appalling insanitary conditions of the time should have been periodically and constantly ravaged by disease. The street or roadway was the receptacle of all food and industrial garbage nor was this refuse swiftly removed. Paving and sewers were of course non-existent. Personal hygiene too was very indifferent. Dr Paul v SORBAIT who was physician to the Empress and medical head of the sanitary service asks in his "Consilium Medicum" Why do more poor people die than rich? and gave as his answer "Because poor people are much less cleanly and because the rich can change their clothes much oftener."

As is sometimes the case when plague assumes epidemic form the fact is not immediately recognized. At all events the authorities did not in 1679 take active steps to prevent the congregation of the people. We read of how on the 22nd March there came to Vienna a Tartar embassy on the 14th June the Papal ambassador made his entry with 50 six-horse carriages a few days later the Russian ambassador rode in with 200 persons, and a month later still the Polish ambassador Prince Radziwiłł, with an innumerable following. The people collected in crowds to see in spite of the royal decree stringently prohibiting such gatherings in streets or buildings. Ultimately the nature of the disease became apparent and the word

Plague rang throughout the town. A flight of the population set in and the town became deserted. People built themselves houses of wood outside city limits or even took to the forest along with wild animals. The well known tale of plague is re-described, where the dead accumulated for want of vehicles for removal or from want of sufficient gravediggers. Criminals were set free from prisons to perform the task. Some observations are made as to the distribution of plague. Women provided more victims than men, a fact which is put down to the necessity for them to go about to get food, their attendance at church and their occupation as nurses of the sick. Clergymen also showed a high mortality easily accounted for by contraction of infection at the sick bed in the course of their duties. Curiously enough, plague doctors did not show this high incidence, as only

6 out of 28 died. This was probably due to their knowledge of how to avoid infection and to their remaining at a safe distance from their patients. The author of the articles has sympathy with Dr Sorhaut the chief medical personage in the epidemic when he hails him as a proponent of the idea that only a doctor can preside over a health department. Little doubt seems to exist that the epidemic was truly plague and not typhus nor smallpox. There does however seem to be some current evidence that typhus did contribute something to the heavy mortality. This epidemic resembled in all respects serious plague epidemics elsewhere such as those of London. Tales of the occurrence of plague simultaneously with human plague among birds dogs and cats are of doubtful validity. It was a summer epidemic and bubonic not pneumonic. W F H

TAYLOR (J) Rural Plague in India.—League of Nations Health Organisation Intergovernmental Conference of Far Eastern Countries on Rural Hygiene Preparatory Papers relating to British India Ser L.O.N.P 1937 III 6 pp 81-92.

Within a short compass a very good review is given by the author of the position of plague in India at the present day and the methods employed in combating it. Plague does not now present the problem which it did in the earlier years of the pandemic. The approximate yearly average of deaths has been 1898-1918 500 000 1921-1930 100 000 1931-1935 50 000. Plague does not now form a major preoccupation of the Public Health Departments of most provinces. Its importance is less than that of other epidemic diseases such as cholera and smallpox. The reduction in plague incidence may be due to the establishment of a degree of immunity in the rat population which has been found actually by experiment to exist. The immunity is roughly proportionate to the prevalence of plague in the areas from which the test rats have been obtained.

In some countries plague pneumonia is a dreaded disease but in India plague is and has been essentially bubonic. This form is always due to flea infection from plague rats. As the habits of the people in India do not allow of any degree of human flea infestation the direct spread of plague from man to man is not a factor in India.

Sylvatic plague which is so important a problem in many other countries does not seem to obtrude itself to any extent in India. *R. rattus* universally distributed is a domestic rat, while *R. norvegicus* is essentially the rat of the seaports and not of the countryside. Field rats in fact do not exist in the large numbers in which they are found in many other countries. Rural plague in India therefore is due to an *R. rattus* house epizootic. Of the three flea transmitters in India *X. cheopis* is the chief, *X. brasiliensis* may be important in the Deccan and *X. astia* is negligible as a direct vector. Where *X. astia* is prevalent *X. cheopis* is correspondingly scarce and plague is rare. Climatic factors vary greatly in different parts of India. These work probably chiefly through their effect on (a) total flea prevalence (b) length of life of the flea, and (c) the production of Bacot's blocking phenomenon in relation to these. It has been recently shown that the climatic conditions in rat burrows underground may differ considerably from those above ground and that this may account for the fact that plague in mild epizootic form, does not die out in the hot weather.

report. Reference too should be made to the instructive historical account of plague in the Mediterranean countries with which the report is prefaced.

W F H

SOREL. Sur le comportement de l'endémie pestense dans les colonies françaises, particulièrement au cours des deux dernières années [Endemic Plague in the French Colonies during the Last Two Years.]—*Bull Office Internat d'Hyg Publique*. 1937 Oct. Vol. 29 No 10 pp. 2071-2092. With 1 chart.

This survey relates to the French colonies of East Africa, Madagascar and Indo-China.

In West Africa (Senegal and Dakar) plague has varied considerably in its incidence from about 2,000 yearly between 1928 and 1930 to 200 in 1932 and 1933 with a rebound to 1,100 in 1934. It has been almost entirely bubonic with only about 10 per cent. primary pneumonic plague. In Madagascar however pneumonic plague especially on the high plateaus, plays a very important rôle. The history of plague in Madagascar has been that it remained a coast disease and bubonic from 1868 to 1921. In that last year it appeared in Tananarive bubonic to begin with and then presented itself in the district of Antananarivo as pneumonic plague, where in 3 months 48 persons died of it. During the 15 years after 1921 plague made further progress. It is established now endemically and epidemically over the whole of the high plateaus, is dominantly pulmonary and capable of giving rise to grave epidemics of this character. A seasonal prevalence of pneumonic plague is apparent, which is related to the cold weather with maximum in August and September. What is striking in the epidemiology of plague in Madagascar is its appearance as a sporadic affection—isolated cases occur having no relation to one another and then the disease manifests itself as small epidemics affecting the family or the village. No doubt seems to exist that the rat and the flea are the means of dissemination of plague, but it is also contended that man himself must be reckoned as a vector agency either by direct infection in pulmonary cases or indirect by his transportation of infected fleas in baggage or merchandise. Nevertheless it has been noted that an imported case has never become a focus of plague so long as the rat population has remained unaffected.

Plague in Indo-China seems to be decreasing—the record is one of descent from 1,300 cases in 1922 to 40 in 1936.

Rats in Madagascar are of the species *Rattus rattus* or black rat, *R. alexandrinus* which has a grey abdomen and *R. frugivorus* which on its ventral aspect is partially pure white or sulphur yellow. The localization of epizootics and their disappearance which is characteristic of the high plateau is doubtless attributable to the habits of *Rattus rattus* which seldom leaves its customary haunts, and also to some extent to the configuration of the country with its sparsely populated villages, its transport of merchandise by human agency etc. These do not favour the displacement to a distance of the rat population. The main plague flea is *Xenopsylla cheopis*. *Ctenocephalus felis*, *P. irritans* and *Xenopsyllus fasciatus* are either rare fleas or of no account. This appears also to be the case for *Leptopsylla murina* and *Echidnophaga gallinacea*.

The methods adopted for antiplague campaigns are much the same as those elsewhere. The interesting statement is made that only

one method is efficacious—in Madagascar at least—for the check of pulmonary plague. It is to isolate all the individuals (family friends and neighbours) who have been exposed to infection. Masks and spectacles must be worn. A regular inspection of these individuals morning and evening ensures early diagnosis of the new case. The experience of fifteen years has shown the absolute efficacy of this method. Rat destruction has had little effect upon the total rat population and is not regarded highly as an antiplague measure. In Madagascar it was calculated that it cost about 1½ francs to capture one rat. It is little use to recommend cats for the extermination of rats for the native of the island regards cat meat as a table delicacy.

Different types of plague vaccination have been adopted in different colonies broadly speaking dead vaccines and living vaccines. In Indo-China the vaccine (dead) of the Pasteur Institute is used. In West Africa a lipovaccine and an aqueous vaccine of the Pasteur Institute (P.S.T.) are favoured while in Madagascar reliance is placed upon vaccine from a living avirulent strain (E.V.) of the plague bacillus. It would appear that the clinical attack of plague is just as severe in the vaccinated as in the unvaccinated so far as relates to killed vaccine and evidently a preference is expressed by the author for the living vaccine. As for specific treatment this is restricted to the use of serum and of bacteriophage. The action of bacteriophage manifest *in vitro* is more difficult to appreciate clinically. Whether the lytic principle be injected intravenously subcutaneously or directly into the bubo the results do not appear to be greatly different from those obtained by serotherapy alone. IF F. H.

GIRARD (G.) Quelques aspects de l'épidémiologie et de la prophylaxie de la peste sur les hauts-plateaux de Madagascar [Epidemiology and Prophylaxis of Plague in the High Plateaus of Madagascar]—*Rev. d'Hyg. et de Méd. Préventive* 1937 Oct-Nov Vol 59 No 8-9 pp 543-554 [14 refs.]

This article is introduced by the sentence — Of all the active foci of plague that of Madagascar has been for 15 years one of the most important in the world. This statement may perhaps be justified on three grounds (1) the frequency of pneumonic plague (2) the contention that the plague cycle is not necessarily rat flea man but may be man flea rat and (3) the use of a living avirulent plague organism for prophylactic vaccination.

The dominance of pneumonic plague in the high plateaus of Madagascar is attributed simply to temperature conditions. A low temperature frequently below 14°C. is normal on the plateaus but is non-existent at the coast. There is moreover no reason to suppose that the organism of Madagascar has any special pneumotropic character. It is however a virulent type of organism and there is no sign of any diminution of severity even of bubonic cases. So-called septicaemic plague which probably only represents cases with inconspicuous buboes is common. No doubt exists as to the reservoir of the virus in Madagascar. It is the rat—*R. rattus* and *R. alexandrinus*. The plague flea concerned is *Xenopsylla cheopis*. *R. rattus* is a climber and is found in the roof as well as the floor of a house. No *R. decumanus* is found in Madagascar and *R. rattus* therefore is also a sewer rat.

In the epidemiology of plague upon the island the flea is a very important factor. It can remain infective for several weeks after

report. Reference too should be made to the instructive historical account of plague in the Mediterranean countries with which the report is prefaced.

W F H

SOREL. Sur le comportement de l'endémie pesteuse dans les colonies françaises particulièrement au cours des deux dernières années. [Endemic Plague in the French Colonies during the Last Two Years.]—*Bull. Office Internat. d'Hyg. Publique*. 1937 Oct. Vol. 29 No 10 pp 2071-2092. With 1 chart.

This survey relates to the French colonies of East Africa, Madagascar and Indo-China.

In West Africa (Senegal and Dakar) plague has varied considerably in its incidence from about 2,000 yearly between 1928 and 1930 to 200 in 1932 and 1933 with a rebound to 1,100 in 1934. It has been almost entirely bubonic with only about 10 percent. primary pneumonic plague. In Madagascar however pneumonic plague, especially on the high plateaus, plays a very important rôle. The history of plague in Madagascar has been that it remained a coast disease and bubonic from 1868 to 1921. In that last year it appeared in Tamatave bubonic to begin with, and then presented itself in the district of Antananarivo as pneumonic plague where in 3 months 46 persons died of it. During the 15 years after 1921 plague made further progress. It is established now endemically and epidemically over the whole of the high plateaus, is dominantly pulmonary and capable of giving rise to grave epidemics of this character. A seasonal prevalence of pneumonic plague is apparent, which is related to the cold weather with maximum in August and September. What is striking in the epidemiology of plague in Madagascar is its appearance as a sporadic affection—isolated cases occur having no relation to one another and then the disease manifests itself as small epidemics affecting the family or the village. No doubt seems to exist that the rat and the flea are the means of dissemination of plague but it is also contended that man himself must be reckoned as a vector agency either by direct infection in pulmonary cases or indirect by his transportation of infected fleas in baggage or merchandise. Nevertheless it has been noted that an imported case has never become a focus of plague so long as the rat population has remained unaffected.

Plague in Indo-China seems to be decreasing—the record is one of descent from 1,300 cases in 1922 to 40 in 1936.

Rats in Madagascar are of the species *Rattus rattus* or black rat, *R. alexandrinus* which has a grey abdomen, and *R. frugivorus* which on its ventral aspect, is partially pure white or sulphur yellow. The localization of epizootics and their disappearance which is characteristic of the high plateau is doubtless attributable to the habits of *Rattus rattus* which seldom leaves its customary haunts, and also to some extent to the configuration of the country with its sparsely populated villages, its transport of merchandise by human agency etc. these do not favour the displacement to a distance of the rat population. The main plague flea is *Xenopsylla cheopis*. *Ctenocephalus felis*, *P. irritans* and *Xenopsyllus fasciatus* are either rare fleas or of no account. This appears also to be the case for *Leptopsylla swinhoei* and *Echidnophaga gallinacea*.

The methods adopted for antiplague campaigns are much the same as those elsewhere. The interesting statement is made that only

one method is efficacious—in Madagascar at least—for the check of pulmonary plague. It is to isolate all the individuals (family, friends and neighbours) who have been exposed to infection. Masks and spectacles must be worn. A regular inspection of these individuals morning and evening ensures early diagnosis of the new case. The experience of fifteen years has shown the absolute efficacy of this method. Rat destruction has had little effect upon the total rat population and is not regarded highly as an antiplague measure. In Madagascar it was calculated that it cost about 1½ francs to capture one rat. It is little use to recommend cats for the extermination of rats for the native of the island regards cat meat as a table delicacy.

Different types of plague vaccination have been adopted in different colonies broadly speaking dead vaccines and living vaccines. In Indo-China the vaccine (dead) of the Pasteur Institute is used. In West Africa a lipovaccine and an aqueous vaccine of the Pasteur Institute (P.S.T.) are favoured while in Madagascar reliance is placed upon vaccine from a living avirulent strain (E.V.) of the plague bacillus. It would appear that the clinical attack of plague is just as severe in the vaccinated as in the unvaccinated so far as relates to killed vaccine and evidently a preference is expressed by the author for the living vaccine. As for specific treatment this is restricted to the use of serum and of bacteriophage. The action of bacteriophage manifest *in vitro* is more difficult to appreciate clinically. Whether the lytic principle be injected intravenously, subcutaneously or directly into the bubo the results do not appear to be greatly different from those obtained by serotherapy alone. H F H

GIRARD (G.) Quelques aspects de l'épidémiologie et de la prophylaxie de la peste sur les hauts-plateaux de Madagascar [Epidemiology and Prophylaxis of Plague in the High Plateaus of Madagascar]—*Rev d'Hyg et de Méd Préventive* 1937 Oct–Nov Vol. 59 No. 8–9 pp 543–554 [14 refs.]

This article is introduced by the sentence — Of all the active foci of plague that of Madagascar has been for 15 years one of the most important in the world. This statement may perhaps be justified on three grounds (1) the frequency of pneumonic plague (2) the contention that the plague cycle is not necessarily rat flea man but may be man flea rat and (3) the use of a living avirulent plague organism for prophylactic vaccination.

The dominance of pneumonic plague in the high plateaus of Madagascar is attributed simply to temperature conditions. A low temperature frequently below 14°C. is normal on the plateaus but is non-existent at the coast. There is moreover no reason to suppose that the organism of Madagascar has any special pneumotropic character. It is however a virulent type of organism and there is no sign of any diminution of severity even of bubonic cases. So-called septicaemic plague which probably only represents cases with inconspicuous buboes is common. No doubt exists as to the reservoir of the virus in Madagascar. It is the rat—*R. rattus* and *R. alexandrinus*. The plague flea concerned is *Xenopsylla cheopis*. *R. rattus* is a climber and is found in the roof as well as the floor of a house. No *R. decumanus* is found in Madagascar and *R. rattus* therefore is also a sewer rat.

In the epidemiology of plague upon the island the flea is a very important factor. It can remain infective for several weeks after

rats have disappeared and will thereafter obtain its meal of blood from man. In this way plague transmission may be effected to a distance from the original focus by carriage thither of still infective fleas. Again, the young fleas which are developed in the paddy rice dust of the Malagassy huts by the hundred may have to obtain their first meal of blood from man. If this occurs during the septicaemic phase of plague they will become infected and in due course infect rats. This is the basis then of a reversal of the usual cycle which now becomes man-flea-rat.

Great difficulty arises over true reporting of plague cases in the backward indigenous population and it is a fact that 95 per cent. of plague cases only become known after the death of the individual. Most effective post-mortem methods of diagnosis (this *Bulletin* 1937 Vol. 34 p 789) have been developed in Madagascar which to a large extent supply the place of notification and permit of early isolation of contacts. This diagnosis is based on examination of lung and liver puncture material obtained from the cadaver. A period of 10 days isolation is regarded as indispensable for contacts, seeing that pneumonic plague may have an incubation period of 6, 7 and even 9 days.

Vaccination with living organisms has been extensively employed in the prophylaxis of plague in Madagascar. The avirulent strain of plague bacillus known as the E.V strain (this *Bulletin* 1937 Vol. 34 pp 406-9) is used and figures of mortality from plague since the vaccine has been officially authorized give encouragement to its continuance.

The total deaths from plague in 1934-35 1935-36 and 1936-37 were 3,606 3,035 and 1,576 respectively. W F H

ROSE (J) Les caractéristiques de la peste à Madagascar. [*Plague in Madagascar*].—*Ann. de Méd. et de Pharm. Colon* 1937 Apr-May-June. Vol 35 No. 2 pp 305-358 With 1 graph.

Plague was introduced into Madagascar in 1898 from an Indian rice steamer. It prevails now over the whole of the High Plateau in endemic form and there has been no intermission in its incidence. Moreover the plague of this region has been very frequently pneumonic. In all its three forms of appearance pneumonic bubonic and septic aemic, it still remains essentially rat plague where man is secondarily infected. Pneumonic plague is of course very infective and transmissible directly from man to man. The tendency to a pulmonary localization seems to be climatic and related to cold weather conditions. Direct contagion cases occur when the atmospheric temperature does not exceed 15°C and, when such temperatures prevail in the High Plateau, pulmonary cases may exceed the bubonic. Seasonal conditions also have an important bearing on the prevalence of plague. These affect the vitality and rate of multiplication of *X. cheopis* which is the chief insect vector of plague.

The epidemiology of plague in Madagascar is characterized by the frequency of its sporadic development in isolated cases with no apparent relation either in time or space to one another its very definite seasonal recrudescences and by the appearance of small family or village epidemics. No such person as a healthy carrier has ever been met with.

Under the notes relating to methods used successfully for limiting and suppressing foci of plague the author makes reference to the one and only procedure applicable to pulmonary plague. It is isolation in quarantine of all persons who have been exposed to infection. Each person is required to wear a mask of gauze and spectacles. Medical visits to those isolated are made night and morning and temperatures are taken. Such measures serve for the immediate discovery of any one at the outset of an attack and he is immediately removed for treatment. For plague in general vaccination is the sheet anchor and is repeated as often as is necessary. Huge vaccination campaigns have been carried out.

The rats concerned in plague are *Rattus rattus*, *Rattus alexandrinus* and *Rattus frugivorus*. Sylvatic plague seems to be of doubtful occurrence and little importance. The plague flea is *X cheopis*. It is a striking fact that the fleas which attack the visitor to native houses in enormous numbers are *Pulex irritans* and *Ctenocephalus canis* or *felis*. This does not mean as was once thought that *X cheopis* does not exist in the free state. It can be found in abundance if searched for in the débris from the pounding of rice.

Vaccination against plague is extensively carried out and the vaccine used is a living vaccine of the EV avirulent strain. In 1934 there were vaccinated 46,879 persons with mortality from plague of 0.47 per cent and a mortality from all diseases of 4.08 per cent. These figures are contrasted with the 1.66 per cent and 9.7 per cent respectively of a control series of 60,000. Treatment of pulmonary plague has been ineffective. Bubonic plague has been mainly treated by serotherapy and in some cases—with much the same result—by bacteriophage.

W F H

WASSILIEFF (A) La peste murine en Tunisie [Rat Plague in Tunis.]  
—Bull. Office Internat. d'Hyg. Publique 1937 Oct Vol 29  
No 10 pp 2097-2105 With 1 folding map

This communication deals with both urban and rural plague of which the latter is the more generally interesting. In the rural zone that is to say the interior of the Regency there has been neither an epizootic nor an epidemic during the past five years. Manifestly it is desirable to maintain this satisfactory state of affairs. Three ways in which contamination may enter the Bled region are suggested: (1) by the wild rodents of neighbouring countries, (2) by sick human beings, (3) by the contact of wild rodents with urban rodents. All the Tunisian rodents are susceptible to plague, some (*Psammomys*) greatly, others (*Meriones*) less. *Psammomys* is the rodent of the South, the *Meriones* occupy the Centre and the North. The second method of penetration is conceived to be from the plague patient to the wild rodent. But the human flea does not transfer its attention to any extent to the rodent and it is not easy to imagine that sylvatic plague will be originated thus in Tunis. That may be so for the scantily populated Tunisian Bled, but the state of affairs is very different in the environs of towns. Here contact is established between wild and urban rodents. The greatest danger of sylvatic plague would then appear to be from the zone in close proximity to towns. It is to this zone that attention has to be paid by careful investigation of the area and the periodic destruction of the rodents which occupy burrows close to human habitation.

W F H



DE ARAUJO (Eduardo) Gatos e peste bubônica. [Cats and Bubonic Plague.]—*Hospital* Rio de Janeiro 1937 Nov Vol 12 No. 5 pp. 769-773.

Cats are susceptible experimentally to plague by cutaneous (with scarification) subcutaneous and conjunctival (with or without scarification) inoculation. It was not found possible to infect cats by feeding them with plague spleen and it would seem that natural plague could only be contracted by them through food, if trauma of the mouth or intestinal mucosa took place. W F H

PUBLIC HEALTH REPORTS 1937 June 4 Vol. 52 No 23.  
pp 748-749 Plague Infection found in Fleas and Lice taken from Ground Squirrels in Washington State.

This report presents the first positive evidence that plague exists among wild rodents in the State of Washington. It is the most northern point in the United States in which wild-rodent plague has been found. As in many previous cases the proof has been given of the existence of sylvatic plague by mass inoculations of fleas and lice obtained from the suspected rodents, ground squirrels of the species *Citellus townsendi*. W F H

PUBLIC HEALTH REPORTS 1937 Aug 27 Vol 52. No 35  
p. 1179—Fleas, Ticks, and Lice retain Plague Infection after 10 Months in Icebox.

Specimens of fleas ticks and lice taken from ground squirrels (*beechys*) and stored in the icebox produced typical plague infection when inoculated into guinea pigs 10 months later. W F H

ADRIER (M.) Etude expérimentale du rôle de *Synosternus pallidus* dans la transmission de la peste [Rôle of *Synosternus pallidus* in the Transmission of Plague.]—*Bull Soc Path Exot* 1937 Oct 13 Vol 30 No 8 pp. 643-646

*Synosternus pallidus* a species of flea which has only recently been distinguished from *Xenopsylla cheopis* is exceedingly common in Senegal. It lives and multiplies in the sandy soil of huts and no one can enter such a native dwelling without bringing away with him these insects on the legs. Investigation and especially experimental investigation on animals, was called for on the capability of this species to act as a vector of plague. Some experiments have been carried out by the author. These experiments coupled with prolonged investigation of epidemiological data, have led him to the conclusion that *Synosternus pallidus* is not a regular parasite of the animals which form the principal reservoir of the plague virus. Consequently the fleas of this species have little opportunity to ingest plague bacilli and, even if they do they do not appear very capable of transmitting their infection. They do not therefore play any important rôle in the propagation of the disease. W F H

DE LA BARRERA (J M) La peste rural en la república Argentina [Rural Plague in the Argentine Republic].—*Bol Sanitario* Buenos Aires. 1937 June Vol 1 No 6 pp 452-487

In this review the author gives all the facts and data available for a judgment on the epidemiology of plague in the Argentine based mainly on his own experience in the territories\* of the Pampas and Rio Negro. He has made several contributions on the subject already, as also have other authorities (see this *Bulletin* 1935 Vol 32 p 447 1938 Vol. 33 p 382 and 1937 Vol. 34 pp 409 410). The questions discussed relate more to epizootics and enzootics than to epidemics to sylvatic plague than urban plague and to the species of rural rodent concerned than to the domestic rat. Two main types of rodent seem to be concerned in epizootics: those which are commonly designated *cuis* and the *Graomys griseoflavus* a member of the family of *Cricetidae*. The name *cuis* includes the genera *Cavia*, *Galea* and *Microcavia*; the species of the genus *Cavia* are very similar in appearance to guinea-pigs. The rodent *Graomys griseoflavus* is arboreal in habit. In their habits these rodents are described as sylvatic or at most subdomestic but not at all domestic like the plague rat. In no case says the author have we seen or had it reported to us that the *cuis* penetrate into occupied human houses. These animals moreover are not used in the Pampas and Rio Negro either for their skin or their flesh. Fleas which are parasitic on the *cuis* are not of common kinds and little is known about them although most of them have been named. The *Parapsyllus talis* seems to be the commonest species.

Plague appearances in the cadaver of the plague *cuis* were not quite the characteristic picture given by plague in the rat. In the male a testicular lesion of hypertrophy, congestion and haemorrhage was present with uncommon regularity. In the territory occupied by the *cuis* the domestic rat is not at all abundant: in fact rats are very scarce and none of the pestiferous fleas of the rat has ever been met with on the *cuis*. The arboreal rodent, *Graomys griseoflavus* is a small animal. It is not very abundant in the south of the Pampas but has been extremely so in the north. A connexion appears to have been established between a small epidemic of human plague which occurred in the department of Loventuel and a severe epizootic in this rodent. At that time these animals were found not only in the hollows of trees but also under stress of hunger in human habitations.

It is scarcely possible to pronounce on the degree of danger to man from the field rodents of the Argentine considering what are the habits of life of the natural animal reservoirs of plague: the sparseness of the population of the regions concerned; the absence of contact between man and the field rodent in habitations; and the absence of knowledge of the vector capacities of the ectoparasites of these rodents. It is probable that plague in these regions maintains itself in the intervals between epizootics in the same rodents of the field as are the known subjects of those epizootics. Prophylactically there seems to be little to recommend except that the peasant of the Pampas should be warned of the danger which he may run from those well known rodents especially in times when uncommon mortality is observed among them.

IV F H

\* By a slip these territories were described in the previous summary (this *Bulletin* 1937 Vol. 34 p. 409) as Brazilian.—W F H.



It is interesting to note that the crew of a ship prefer cyanide to sulphur fumigation because it is so lethal to cockroaches and other vermin. Although owners and agents may prefer sulphur fumigation because it does not necessitate making provision for the crew ashore it seems probable that from the point of view of cost and time it may be superseded by hydrocyanic acid gas. H F H

REITANO (U) A propos de la valeur d'un vaccin pesteux vivant dans les épreuves d'immunisation sur les animaux (Note II) [Value of Living Plague Vaccine in Animals.]—*Boll. Sezione Ital. Soc. Internaz. di Microbiologia* Milan 1937 Mar Vol 9 No 3 pp 60-64

It is evident from this study that every avirulent living strain of plague is not possessed of immunizing power. The avirulent strains which have so far been used in man for protective purposes are evidently of special character. In the experiments conducted by the author with his avirulent living strains doses up to 6 cc of a bouillon culture and the whole surface growth of an agar culture were inoculated in guineapigs and in rats without producing any infection. Later tests with the strains available showed that they were very deficient in immunizing power. H F H

REITANO (U) Recherches sur la vitalité sur la virulence et sur l'éventuel pouvoir immunisant du *B. pestis* desséché (Note I) [Vitality, Virulence and Immunizing Power of Desiccated Plague.]—*Boll. Sezione Ital. Soc. Internaz. di Microbiologia* Milan 1937 Mar Vol. 9 No 3 pp. 55-60

Desiccation was effected in 24 hours at moderate temperature *in vacuo* and over phosphoric anhydride. Living cultures could be obtained from the dried bacilli up to 30 months after desiccation but they were not infective to guineapigs even when mixed with other organisms. No immunizing power was manifested by the dried plague bacilli and therefore it is useless as a vaccine. H F H

PUBLIC HEALTH REPORTS. 1937 Oct 29 Vol 52 No 44 p 1535  
—Vaccination against Bubonic Plague in Madagascar

SASSUCHIN (D) & TICHOMIROVA (M) De la conservation des *Pasteurella pestis* dans les larves et les nymphes des tiques *Dermacentor silvarum* Olen. [Preservation of *Pasteurella pestis* in the Larvae and Nymphs of the Tick.]—*Rev. Microbiol. Epidemiol. et Parasit.* 1936. Vol. 15 No 3-4 [In Russian pp 357-361. French summary p 362.]

The larvae and nymphs of the tick *Dermacentor silvarum* infest rodents such as *spermophils* gerbils *Arvicola* and others. Epizootics of plague have also affected these same rodents and as the tick in its adult stage can parasitize large animals such as the camel horse and man it was worth while investigating the possibility of transmission of plague from larva or nymph to adult tick and thence to man. Larvae and nymphs were fed on plague infected guineapigs and it has been possible to isolate plague bacilli from larvae after 2 4 6 and 10 days and from nymphs after 2 to 6 days. No success was registered, however in transmission of plague virus from the larval stage to the nymph stage. H F H

## HELMINTHIASIS.

LINA (Abdon Eloy Estellita) *Ovohelmintoscopias*. [Search for Worm Ova in Faeces].—*Boletim da Secretaria Geral de Saude e Assistencia* Rio de Janeiro 1936, Dec. 31 Vol. 2, No 5. pp. 83-83 With 8 figs. on 5 plates. English summary (10 lines)

The author employing the technique described below states that he obtained much better results from direct examination than by ordinary methods [he does not compare his with the more highly concentrating methods of Clayton LANE and others]

He employs an enrichment fluid composed of acetic acid 5 cc. formal 10 cc. hydrochloric acid 75 cc. and distilled water 110 cc. and the steps of the procedure are as follows

One cc. of the enrichment fluid is placed in a conical glass with an equal amount of faeces and the two mixed with a glass rod to a uniform suspension, after which the reagent is added slowly to 20 cc. and after rapid stirring with a glass rod is transferred to a centrifuge tube and spun for two minutes. the supernatant fluid is decanted and the deposit spread with a pipette on a slide and examined.

Among the advantages claimed for this method are that the morphology of eggs and larvae is not altered, that the specimen keeps well for demonstration purposes and gives a higher percentage of positive findings 40 per cent., as compared with an average of 12 per cent.

H H S

ARTIGAS (P de Toledo) *Mounting of Helminths and Small Arthropods. A New Simple and Efficient Method.*—*Mém Inst Butantan* 1935-1936 Vol. 10 pp. 71-75 With 10 figs. on 4 plates. [Portuguese version pp 65-70]

In this paper a new method is described for toto-mounting nematodes. This new method can also be used with plathelminths and small arthropods.

The mounting medium is obtained by dissolving mastic resin (from *Pistacia lentiscus*) in creosote [beechwood creosote]

This mastic-creosote fluid is prepared as follows

" 30 cc. of 95 per cent alcohol are added to 10 gm. of pulverized mastic. The mixture is left in an incubator at 55°C for 24 hours. Then, the alcoholic mastic is taken off and, after cooling, centrifuged. The sediment is then poured off by decantation and, if necessary the fluid is centrifuged once more

30 cc. of pure creosote are added to the alcoholic mastic and the whole mixture is placed in the incubator at 55° until complete evaporation of the alcohol. The resulting fluid which is clear and sirupy after solidification takes a yellowish coloration

A very simple mounting technic has thus been adopted

1 Treatment with acetic acid. The length of time required varies according to the thickness and size of the nematode and is completed with its clearing

2 Treatment with creosote. In this substance remains the nematode until fully impregnated. There is no harm to the specimen in prolonging this step for some hours

" 3 Mounting between slide and cover-slip in mastic-creosote fluid.

" 4 Hardening of the mounting medium in the incubator at 50°C.-55°C.

" In order to obtain coloured preparations, the material must be treated with hydrochloric carmine or Semichon's acetic carmine (prepared according to Langeron's indications). The staining precedes the other steps

of the mounting technic. Overstaining differentiation is done by means of hydrochloric water or hydrochloric alcohol

[Presumably glacial acetic acid is intended] Clayton Lane

WEBB (J Lewis) The Helminths of the Intestinal Canal of Man in Mauritius, and a First Record of *Trichostrongylus axei* Locally.—*Parasitology* 1937 Oct. Vol 29 No 4 pp 469-476 With 11 figs. [13 refs.]

Systematic measurements of all hookworm like eggs from the faeces of 336 patients in Mauritius led to the finding of 8 per cent. *Trichostrongyle* 0.9 per cent. *Ternidens diminutus* and 0.9 per cent. *Ancylostoma brasiliense* like eggs. This percentage of *Trichostrongyle* eggs includes one case from an inhabitant of the French colony Réunion

Hookworm eggs of a very small size possibly *Ancylostoma brasiliense* were found unassociated with the typical *Necator americanus* eggs in the faeces of an inhabitant of Rodriguez the adult worms appeared drug resistant. A partial eradication of the *Trichostrongyles* was obtained in one case and an apparently complete eradication in another of 6 patients treated with carbon tetrachloride The *Trichostrongyles* expelled by one of the patients were identified as *Trichostrongylus axei* (Cobbold, 1879) Railliet & Henry (1909) No particular symptoms which could be ascribed to the action of the *Trichostrongyles* were observed in any of the affected patients Drugs administered orally to a patient passing *Ternidens diminutus* like eggs failed to dislodge any of his worms.

C L

NEUJEAN (G) Le parasitisme intestinal chez les indigènes des hauts plateaux (environs de Kitega) [Intestinal Parasitism in the Inhabitants of the Kitega District].—*Ann Soc Belge de Méd Trop* 1937 Sept 30 Vol 17 No 3 pp 343-349

The author has examined the records of patients admitted to hospital during the period 1929 to the end of October 1936 to find out the number with parasitic infections and the relative frequency of occurrence of these parasites. Those who have been admitted more than once are counted as fresh patients The examination of the stools was made by direct smear and the results are consequently an understatement Altogether 13 460 were examined all the findings are given as percentages An average of 64 per cent were infected the limits in any one year being 59 and 67 so that the infestation rate is fairly constant Of helminthic parasites *Ascaris* was the commonest 35 per cent *Trichuris* next 25 and *Ankylostome* 11.9 *Taenia saginata* 9.3 These are the averages over the whole period Sixty two per cent harboured one parasite only 29 had two 7 had three, and one per cent had four rarely as many as seven were found. Actual figures and percentages are given in tables.

H H S

LEGENBRE (F) Le parasitisme intestinal au Cambodge [Intestinal Parasitism in Cambodia].—*Bull Soc. Path Exot* 1937 July 7 Vol 30 No 7 pp 570-572.

A report on 361 stools examined in Cambodia by simple smear and if negative by the Willis technique

The percentages of infection so revealed were hookworms 54 ascaris 30 trichuris 9 strongylodes 9 dysenteric amoeba 14 and trichomonas 9 There were also detected infections with *Clonorchis*

[March 1938]

*tricusis* *Taenia saginata* *Hymenolepis nana* *Lambia* and *Balan*  
*tidium*. As to multiple infections there were five once four 5 times,  
 three 28 times two 97 times and simple infections with hookworms  
 numbered 87 ascari 37 dysenteric amoebae 24 strongyloides 7

C. L.

HOKUDA (Saburo) & ARI (Kenji) Ueber die Darm-Parasiten  
 des an Tukemono haften [On the Eggs of Intestinal Parasites  
 which adhere to "Tukemono."]—*J. Oriental Med.* 1937  
 Aug Vol 27 No 2 [In Japanese pp. 89-94] German  
 summary p 9]

In the State of Darien some 35 per cent of Tukemono in markets  
 have adherent to them eggs of ascari ankylostomes trichuris,  
 metagonimus or taenia ordinary rimang does not clean Tukemono  
 which is, accordingly a large factor in the spread of worm infections.

C. L.

BRUG (S. L.) & TESCH (J. W.) Parasitaire wormen aan het Lindoe  
 Meer (Oa. Paloe Celebes) [Parasitic Helminthiasis Infections in  
 Inhabitants by the Lindoe Lake, Celebes.]—*Geneesk. Tijdschr. v. Nederl. Indië* 1937 Sept 7 Vol 77 No 38 pp. 2151-2158.  
 With 2 figs. (1 on a plate) English summary

Lindoe Lake is a secluded part 1 000 metres above sea-level, in the  
 Paloe District. The authors examined by direct smear apparently  
 98 samples of faeces and found a very unusual distribution of hel-  
 minthic ova. Trichuris was not seen in any. Ascari in 3 per cent.  
 only and most of these were unfertilised. Ankylostome ova were  
 found in 33 per cent but in many cases the infestation was very mild,  
 perhaps only one egg in a slide. Ova of *Sch. japonicum* were seen in  
 8 per cent and the infection index was probably much higher.  
 Eggs were seen in a large proportion of those examined which were  
 indistinguishable from those of *Echinostoma ilocanum* a diagnosis  
 checked by Dr. TURANGUI of Manila, who however stated that no  
 adult flukes being submitted to him he could not be quite certain.  
 They were found in 47 per cent of the total and in one village in 21  
 out of 25 specimens

H. H. S.

MULLER (H.) & TESCH (J. W.) Autochthonous infection met *Schistosom*  
*japonicum* op Celebes. [Indigenous Case of Infestation  
*Sch. japonicum* in the Celebes.]—*Geneesk. Tijdschr. v. Nederl.*  
*Indië* 1937 Sept 7 Vol 77 No 38 pp. 2143-2150. With  
 5 figs. on 1 plate. English summary (7 lines) [16 refs.]

Description of a case of an autochthonous infection with trematode  
 eggs in a native from the environments of Lake Lindoe (Central  
 Celebes) discovered during the histological examination of the inner  
 organs and first thought to be paragonimiasis. BRUG showed by  
 isolation of the eggs that it was schistosomiasis japonica. This is the  
 first autochthonous case known from the Netherland Indian  
 Archipelago

VAN DEN BERGHE (Louis) Quelques faits nouveaux concernant la migration et la ponte des schistosomes [New Facts on the Migration and Oviposition of the Schistosomes.]—*Ann Parasit Humaine et Comparée* 1937 July 1 Vol 15 No 4 pp 354-362. With 2 figs on 1 plate

The paper brings out three new facts regarding the migration and oviposition of schistosomes and confirms three others contested by some writers and ignored by others.

As to the first it is recorded and confirmed by micro-photographs that in the uterus of *S. bovis mattheei* the egg may lie with its spined end pointing to the head or to the tail of the mother worm the females of *S. margrebourgi* of the antelope *Onotragus (Cobus) lechwe* of Lake Kusalé in the Belgian Congo may lie outside blood vessels and probably in lymphatic vessels *S. mansoni* may not be limited to network of the inferior mesenteric vein As to the second in all these species female worms may be found alone in the veins near the bowel whole solitary males are far rarer there though in the liver they are four times as common as solitary females paired worms are present not only in the vessels near the submucosa but also in the large mesenteric arches eggs in the liver may have been carried there by the blood current or may have been posited there for apart from *S. japonicum* the worms may inhabit any part intestinal or visceral of the portal system C L

SCADUTO (Pasquale) Considerazioni su alcuni casi di bilharziosi vescicale. [Some Cases of Vesical Bilharziasis.]—*Arch Ital Sci Med Colon e Parasit* 1937 Apr Vol 18 No 4 pp 235-243

Eight cases are described from Tripoli with eggs of *Schistosoma haematobium* in the urine and in two of them in the faeces also

C L

KRÖBER (F) Ein Fall von doppelseitiger Hodentuberkulose die mit Bilharzia vergesellschaftet war.—*Arch f Schiffs u Trop Hyg* 1937 Oct. Vol 41 No 10 pp 644-647 With 1 fig

EERKENS (J W) & VAN DER HORST (G A.) Een geval van Schistosomiasis Japonica te Semarang.—*Geneesk Tijdschr v Nederl Indië* 1937 Sept 21 Vol 77 No 38 pp 2305-2310 With 2 figs. on 1 plate. English summary (4 lines)

SERRA (Giovanni) Il rame quale nuovo rimedio nelle bilharziosi intestinale e vescicale. [Copper in the Treatment of Intestinal and Vesical Bilharziasis.]—*Arch Ital Sci Med Colon. e Parasit* 1937 Apr Vol 18 No 4 pp 244-253

The remedies used in these 15 cases treated at Jadotville in the Belgian Congo were dicuprene intravenously in 4 paludex by mouth in 8 and both drugs by the routes indicated in 3 The drugs were given daily without ill effects in any case and the reports of efficiency are good

The daily dose of dicuprene lay between 5 and 10 cc. All 4 persons had an intestinal infection with *S. mansoni* Eggs disappeared on



days 6 5 11 and 10. The daily dose of paludex was sometimes 0.5 gram sometimes 1.5 gram and sometimes progressively increasing from 1.2 or 1.25 to 2 grams and eggs disappeared on days 7 8, 8, 8, 10 11 8 and in the remaining case were disintegrated at the last report. It is concluded that oral administration is more effective quick, and constant and needs no special apparatus C. L.

GMINDER (Ernst) Bilharziose und Operation [Bilharriasis and Operation.]—*Arch. f. Schiff- u. Trop Hyg* 1937 Oct. Vol. 41 No. 10 pp 647-650

Some operations which have in common the fact that they have been undertaken for non-bilharzial conditions in persons who had this infection and who had recently been treated with foudrin have been followed by bleeding. It is suspected that this may be due to a lessening of clotting power the result of the drug. It is accordingly suggested that there should be an interval of at least 4 weeks between the end of such a course of treatment and any operation C. L.

LA RUE (George R.) & AMIEL (Donald J.) The Distribution of *Paragonimus*.—*Jl Parasitology* 1937 Aug Vol. 23 No. 4 pp. 382-388 [37 refs.]

There is considered the distribution of *Paragonimus* in general and in North America in particular.

As to North America

"The snail is evidently the most important factor in limiting the distribution of *Paragonimus*. The musk, unquestionably the normal definitive host in North America, is an inhabitant of all the wooded habitats on the continent where there is permanent fresh water. It is absent only in northern Labrador in Newfoundland and in Greenland. However intensive trapping for its valuable pelt has so reduced the numbers of the musk that probably it has disappeared from many portions of its former range with a resultant diminution of the range of *Paragonimus*. Furthermore, *Paragonimus* through the great reduction in numbers of its definitive host may be so rare in many localities as to escape detection. The crayfish, while far more limited in distribution than the musk, is present in a large part of the same range wherever compatible conditions exist. As will be noted from the list of locality records given below the snail, *Pomatiopsis lapidaria* is still unknown from a large part of the region occupied by the musk and the crayfish. Apparently it is uncommon in many parts of its range, though it may be abundant in restricted areas."

C. L.

MORI (Junzo). Beiträge zur Kenntnis der Entwicklungsgeschichte speziell der biologischen Eigenschaften des *Paragonimus westermani*. [The Development of *P. westermani* with Special Reference to Biological Peculiarities.]—*Sci. Rep. Med. Jl.* 1937 Apr Vol. 56. No. 4 [In Japanese pp. 585-618. With 10 figs (8 coloured) on 2 plates [42 refs.] German summary pp. 5-7]

The travels of *P. westermani* from the freeing of the cysts in the small intestine to their adult condition in the lungs.

The experimental animals were 21 kittens, 4 pups and one white rat. The belief is that the larvae pierce the small intestine and make for

the pleura through the liver if it lies in their way and in any case through the diaphragm bore into the lungs and so into pulmonary vessels or bronchi, though some may get into the lungs by the blood vessels. It is not stated whether in all three species of experimental animals used the conditions found were the same. The beautiful figures lose much of their worth for non Japanese readers owing to the failure to translate their legends into the European language chosen for summary, an omission which is not always found in the journal. C L

MEIRA (João Alves) & HOSOE (Ignacio Shizuo) Sobre um caso de distomatose pulmonar (Paragonimíase) [A Case of Paragonimiasis].—*Hospital Rio de Janeiro* 1937 Sept Vol 12, No 3 pp 385-399 With 6 figs [14 refs.] English summary

A Japanese who had been only about a year in Rio de Janeiro had this infection. His illness had a long history. C L

KUANG WU Deux nouvelles plantes pouvant transmettre le *Fasciolopsis buski* Revue générale [Two New Plants on which infection with *F. buski* may be transmitted.—*Ann Parasit Humaine et Comparée* 1937 Sept 1 Vol 15 No 5 pp 458-464 With 1 text fig & 7 plates [12 refs.]

The two new plants on which metacercariae of *Fasciolopsis buski* have been found are *Salvinia natans* and *Spirodela (Lemna) polyrrhiza*.

After a short note on the life history of this fluke and on the different plants used by the cercaria for encystment it is felt that this is not a fastidious creature but can live on almost any kind of water plant which grows in stagnant water near infected snails. The newly implicated plants float on the surface of water collections in which are cultivated two other of these vegetable hosts the water chestnut and the water bamboo. About 20 cysts have been found on the under surface of a single leaf of each of these plants which put down long roots very rich in cellular tissue. They are common in the endemic area about Chekiang except in winter. C L

MCCOY (Oliver R.) & CHU (T C) *Fasciolopsis buski* Infection among School Children in Shaohsing and Treatment with Hexylresorcinol.—*Chinese Med J* 1937 June Vol 51 No 6 pp 937-944

Of 349 children from whom 0.005 gram of faeces was examined in decinormal caustic soda solution 65 per cent showed eggs of *F. buski*. Of the positives 129 were treated with hexylresorcinol and the results are given.

The positive percentages at different ages varied between 60 and 74 while for males they were (by coincidence) 60 and for females 74 taking all ages together. The percentage of the positive cases which showed up to 5 000 eggs per gram of faeces was 54 between that and 20 000 was 38 and above that number 8. In addition only 11 per cent. of those examined were free from intestinal helminths 43 per cent. harboured ascariis 19 per cent. trichuris and only 2 persons (0.6 per cent.) hookworms to this method of faecal examination.

According to Stoll and Kwei (1932) [Stoll, Cort & Kwei this *Bulletin* 1927 Vol. 24 p 981] the egg production of a single worm averages 250 eggs per cc. of formed stool. Hence the majority of children harbored

comparatively light infections of 20 worms or less. Only 17 students (8 per cent. of the total number examined) had egg counts of more than 20 000 eggs per cc., equivalent to infections with 80 worms or more. The highest egg count in the series, 158,000 eggs per cc. (= approximately 640 worms) was found in a nine year old girl. This girl was the only child in the entire group who showed the classical symptoms of fasciolopsiasis, namely, diarrhea, distended abdomen, edema of the face and stunted development. Incidentally the parents of this girl refused to allow treatment. According to Barlow (1925) the presence of only a few worms is sufficient to cause symptoms. If a careful physical examination had been made of these children, undoubtedly many more would have been found to be suffering from the effects of the parasite."

Dosage of hexylresorcinol was from 0.4 gm. for a child under 7 to 1 gm. from 13 years onwards. On re-examination 2 to 3 weeks after treatment egg numbers were as follows. No reduction to 50 per cent. reduction, 5 per cent. 60 to 80 per cent. reduction 6 per cent. 80 to 90 per cent. reduction 11 per cent. 90 to 100 per cent." reduction, 23 per cent. no eggs, 54 per cent.

The majority of children treated experienced no ill effects from the drug aside from slight gastric discomfort for about two hours after taking the drug. In about 10 per cent. of cases, however, nausea and abdominal cramps were quite severe and the patients experienced a definite chill. A purge of magnesium sulphate was given to these children (about 2 hours after the drug) and after an hour or two of rest, the symptoms subsided. Four children vomited, but the pills had already dissolved and could not be recognized in the vomitus. Re-examination later showed that the treatment of these cases had been successful.

In three children who experienced severe intestinal cramps and chills, a diffuse urticaria appeared which persisted for several hours."

"Six of the 7 hospital patients were re-examined after one week. Their total egg count had been reduced 96 per cent. and an estimated number of 390 worms removed. Less than half of this number were recovered within 24 hours after treatment. The remainder must either have been passed on succeeding days or have disintegrated within the body. This observation emphasizes the well-known fact that the effectiveness of treatment with hexylresorcinol should not be judged solely by the number of worms passed immediately following treatment.

[The worm-egg ratios of STOLL, CORT and KWEI were based on counts made on six cases in which the eggs counted per fluke recovered varied between 14 623 with exactly 300 flukes recovered and 48,125 with 32 flukes. Variations of 3½ times in such a small series are surely a poor basis for confident general conclusions. Further the earlier writers wrote "The worm counts for *Fasciolopsis banksi* are relatively simple with such large parasites and undoubtedly are more accurate generally speaking than for hookworms" and they collected all worms passed for three days. The use of these six cases as a basis for general worm egg ratios must further lose value in proportion as dead worms are digested as they slowly pass down the bowel.] C. L.

OTTO (Johann Heinrich F.) Ueber den chinesischen Leberegel *Opisthorchis sinensis*. Zur Entstehung Erkennung und Behandlung der durch ihn bedingten Krankheit. [The Mode of Infection, Diagnosis and Treatment of *Clonorchis sinensis*.]—*Arch f. Schiffss- u. Trop. Hyg.* 1937 July & Aug. Vol. 41 Nos. 7 & 8. pp 481-505 552-565 [8 pages of refs.]

A very wide survey of present knowledge on these different aspects of this infection. C. L.

KELLER. Note sur une nouvelle méthode de traitement de la sparganose oculaire [A New Treatment of Ocular Sparganum Infection] — *Bull Soc Méd-Chirurg Indochine* 1937 May Vol 15 No 5 pp 524-536.

The Director of the Ophthalmological Institute of Hanoi details 12 cases in which ocular sparganum infection has been treated with novarsenobenzol with results hitherto unequalled.

Keller has treated over 60 cases of this infection. At first an enthusiastic advocate of surgery, he has come to regard this as not merely useless but dangerous for the ophthalmia does not disappear with operation, may indeed be increased with corneal ulceration, panophthalmitis and the necessity to remove the globe in order to get rid of all the parasites. The frog poultice which gives the infection may be applied over the eye after simple opening of its abdomen after evisceration or it may consist of sliced frog muscle. Apparently there is a thermotaxis and the invasion by the parasite gives rise to itching, smarting or burning with immediate oedema and the rapid onset of inflammation. Local injections proved unsatisfactory (though cure may be spontaneous) and the closure of the lids by tarsorrhaphy was of some advantage in the last resort. Then intravenous injections of novarsenobenzol were tried, tarsorrhaphy being also undertaken to preserve the cornea till the worms had been killed. The dose of the drug is 30 cgm for adults and 7 to 15 for children according to age, two to six doses having been given at intervals of 4 or 5 days. The parasites as a rule were adsorbed rarely they were discharged on to dressings, relief beginning with the first dose. C L

YMAZ APFHATIE (I Lucio) Purificación de la toxina y anatoxina hidática. [Purification of Hydatid Toxin and Anatoxin.] — *Prensa Méd Argentina* 1937 Sept. 8 Vol 24 No 36 pp 1731-1733

When hydatid fluid is treated with trichloroacetic acid albumen is precipitated, this is separated quickly and redissolved in alkali. The acid precipitates at pH 4 or lower the tovalbumins and anatoxin which are separated by centrifuging, redissolved in solutions of carbonate and phosphate of sodium and made up to the original volume by normal saline.

The author's technique for separating the hydatid tovalbumin is as follows —

To the transparent hydatid fluid pH 6.7 are added 4 drops of normal solution of trichloroacetic acid for each cc. of fluid, the pH reduced to about 3, the product being then shaken and put aside for 10 minutes when a fine turbidity forms which is thrown down by centrifuging. The precipitate is dissolved in 0.9 per cent. NaCl with addition of 4 drops of normal  $\text{Na}_2\text{CO}_3$  and the pH becomes 6.5. The amount of saline employed is one-fifth of the hydatid fluid, so that the albumen is in a five-fold concentration.

For separation of the anatoxin —

To 10 cc. of the anatoxin of pH 6.3 are added 10 drops of normal trichloroacetic acid, the mixture shaken and in 10 minutes a suspension forms which is thrown down by centrifuge, redissolved in 0.9 per cent. NaCl (one-fifth of the original volume) and one drop of normal  $\text{Na}_2\text{CO}_3$ , the product is purified and five-fold concentrated anatoxin with pH 6.6.

The supernatant fluid after centrifuging off the precipitate formed with the trichloroacetic acid is neutralized with normal  $\text{Na}_2\text{CO}_3$ , 2 drops

for each cc., and the resulting fluid, of pH 6.4 contains the saccharide fraction of the liquid.

The albuminoid fraction gives more intense intradermal reactions than does the pure hydatid fluid—the saccharide fraction also more than the pure fluid but less than the albuminoid fraction, in fact intermediate. Similarly the albuminoid fraction has a much higher specific antigenic potency than the saccharide fraction. H H S

PENFOLD (W. J.) PENFOLD (H. Boyd) & PHILLIPS (Mary) The Criteria of Life and Viability of Mature *Taenia saginata* Ova.—*Med Jt Australia* 1937 July 3 24th Year Vol. 2. No. 1 pp. 1-5

The attempt was made to discover whether there was any method of determining viability of onchospheres apart from infecting experiments and this failing these were used to test the effects of other conditions on their length of life.

The writers after long continued observations, have never been able to satisfy themselves that there were flame cells in onchospheres nor did absence of movement in the onchospheres themselves signify death seeing that batches of motionless eggs were able to infect. Of onchospheres kept in normal saline at 2°C to 5°C for 13½ weeks some were, but after 14½ weeks none was viable while if kept in this solution for 9 weeks and then exposed on pastures for 8 weeks in mild weather conditions some were still viable. Again those kept on dry pastures for 14½ weeks might be viable while of onchospheres kept dry for two days under laboratory conditions some were viable. [Air convection is then at least a possibility.] If however dried in normal saline that is with a salt solution becoming steadily stronger none was alive after one day. Probably eggs do not survive on pastures in Victoria for many months. C L.

MAPLESTONE (P. A.) & BHADURI (N. V.) *Taenia solium* and *Cysticercus cellulosae* in India.—*Indian Jt Med Res.* 1937 July Vol. 25 No. 1 pp. 155-161 [28 refs.]

"This brief survey of the puzzles in the epidemiology of *T. solium* and cysticercosis in India suggests two possibilities—one that there are factors in the transmission of these infections with which we are at present not acquainted, and that the accepted life-history of this worm is subject to certain modifications depending on local conditions, and the other is that our records are at present altogether misleading. Whichever of these be accepted it is clear that there is a great deal to be known about the epidemiology of this parasite in India before the disease can be adequately controlled.

This survey of the literature while not claiming completeness, has been thorough. For the 59 years up to 1925 only 10 cases of cysticercosis were reported in Indians. In the last 23 years 82 cases have been reported from British soldiers who were serving or had served in India, and of them 22 harboured tapeworms. As to pig infection Duncan STEWART in 1844 commented on how often pork had to be thrown away in Calcutta on account of its measly state, while the writers believe that the same holds good to-day. With this frequent pig infection there must be either some definitive host other than man an unlikely thing, or infection with the strobile must be far commoner in Indians than present knowledge shows while as to the cysticercus

in them it is held that its effects in causing fits and mental derangement would have led to its being brought to the wide notice of medical men. Accordingly it is suggested that there may have been developed in Indians an enhanced resistance to infection by the onchosphere while as to the absence of report of strobiles in so many European soldiers infected with cysticerci it is suggested that on occasion these may be digested so freeing the eggs as LEIPER has shown to be the case for *D. latum* [this *Bulletin* 1937 Vol 34 p 399] [The work of PENFOLD, PENFOLD & PHILLIPS (above) suggests the likelihood that air convection is one of the missing factors.] C L

RAO (M Sambasiva) Cysticercosis as a Possible Cause of Epilepsy In an Indian.—*Lancet* 1937 Sept 18 p 689

A Hindu coolie aged 28 was admitted to the Perampur Madras Hospital having started jerking movements of the left forearm 3 days earlier. There was no aura before the attacks and no unconsciousness. A nodule in the right deltoid which he claimed to have cherished for 20 years, proved on excision to be a typical cysticercus the scolex having 4 suckers and a double row of hooks. It was uncalcified and X rays showed no shadows in the brain. He used to eat pork but he said had never had a tapeworm. C L

SUNAES (E J) & SELLERS (T F) Tapeworm Infestations in the Southern United States.—*Amer Jl Public Health* 1937 Sept Vol 27 No 9 pp 893-898 [13 refs.]

A survey of literature and of answers to questionnaires received from 11 of 13 State Board of Health Laboratories to whom they were addressed.

Nine hundred twenty-seven thousand six hundred twenty five fecal examinations in 13 southern states from 1931-1935 inclusive show 8 085 positive tapeworm findings of all types a mean incidence of 0.87 per cent. Of the 7,249 positive findings which could be classified, 98.6 per cent. were the dwarf tapeworm (*H. nana*) an average incidence of 1.1 per cent. Only 100 other types of tapeworms [? tapeworms of other types] were found in this survey of which 58 were beef tapeworm (*T. saginata*) 32 rat tapeworm (*H. diminuta*) 8 pork tapeworm (*T. solium*) and 1 each fish tapeworm (*D. latum*) and dog tapeworm (*D. caninum*).

Histories are given of cases of human infestation with the fish tapeworm, the rat tapeworm and the dog tapeworm.

Data regarding the prevalence of human infestations with tapeworm are incomplete due to the failure of a number of state board of health laboratories to classify their findings.

C L

CASTELLANI (Aldo) Luetie Pseudo-Cysticercosis.—*Jl Trop Med & Hyg* 1937 Oct. 1 Vol. 40 No 19 p 232. [Summary appears also in *Bulletin of Hygiene*]

The condition described is characterized by the presence of small nodules the size of rice-grains seeming to lie free in the subcutaneous tissue or in the muscle fascia of legs and arms. They are hard or slightly elastic little if at all tender not itching and not accompanied by eosinophilia. The author refers to three such cases coming under his observation two of which had been diagnosed as cysticercosis and

registered relating to children whose births had actually occurred before that year. These were discovered when children entering school were required to produce certificates.]

The average labour force employed on Estates Logging Camps etc., was 9 135. Health conditions throughout the year are reported to have been good. 128 deaths were recorded. Estate labourers admitted to Hospital for malaria numbered 1 734 with 31 deaths for beriberi 161 cases with 5 deaths pneumonia 120 cases with 32 deaths and dysentery 102 cases and 5 deaths. The mass treatment of labourers for *ankylostomiasis* was continued and 4 172 labourers treated.

*Maternity and Child Welfare Work*—In the Report under review little information is available but it is clear that such work is actively implemented from the references to the weekly clinics held at numerous centres records of spleen rates for infants and children contributed by Medical Officers etc. As regards midwives the *Misadresses Ordinance* of 1931 prescribed regulations and syllabuses for examinations and for the supervision of midwives.

In 1935 a scheme for the training of young women as midwives for work in native villages was approved and two Chinese were selected to commence the course of training. Both were successful at their examinations one commenced work in Jesselton District the other in the Beaufort District.

*School Hygiene*—In addition to Vernacular Schools and a Chinese Settlement School maintained by Government there are a large number of State-aided Mission Schools and several unaided Schools. In Sandakan and Jesselton school-children are examined yearly for hookworm and are treated if necessary. No other information appears under this heading though it is noted that spleen rates for children under 16 are recorded by District Medical Officers.

*Public Health Sanitation etc.*—The Staff of the Medical Department comprises a Principal Medical Officer Dr P. A. DINGLE five District Surgeons European Nurse-Matrons at Sandakan and Jesselton and a number of qualified dressers in charge of various dispensaries.

[General sanitary measures are not described in the Report under review but as the result of communication with Dr Dingle it can be said that Sanitary Boards are established for the six principal centres of population and also at a number of smaller townships. As regards the disposal of sewage in the capital, Sandakan water-borne systems of drainage into septic tanks are installed at all European houses and at a number of houses of well-to-do Chinese merchants. Public latrines with drainage to septic tanks are established in the town among the Chinese small-holders bore-hole or pit latrines are usual, while the native population of the town being housed over the sea, disposes of sewage by dumping into the water below. In other towns septic tank installations are being provided where water supplies are available and adequate public latrines are constructed over the sea. In native villages, adjacent rivers are made use of. Efforts are being made to introduce sanitary pit-latrines in rural areas.

In Sandakan piped water supplies after filtration and chlorination are available for all houses standpipes are provided at different centres for those who cannot afford to pay a tap rate. In Jesselton piped supplies are laid on to all European houses, standpipes providing supplies for the remainder of the population. Two deep wells provide Kudat with water supplies being pumped to a storage tank and thence

conducted to standpipes in the town. At Lahad Datu river water and at Tawau spring water sources are pumped to the respective towns and made available through the medium of standpipes.]

*Anti-malarial measures* were inaugurated in 1929 and have continued to be energetically applied since that year streams seepage areas and other potential breeding places of anophelines receiving the regular attention of the labour gangs employed.

*Port Health Work*—Sandakan is the principal port of the State 56 vessels entered and 7 084 passengers and 4 779 members of crews were examined. Other ports are Jesselton Kudat Lahad Datu Semporna and Tawau at Jesselton the 87 passengers and 111 crew of one vessel were examined and at Tawau where 6 vessels entered 221 passengers and 392 crew were dealt with. A quarantine station is maintained on the Island of Berhala about 3 miles from Sandakan. No infected vessel was reported during the year. Rat destruction in Sandakan port area continues regularly during the year 1,561 rats were destroyed 632 were examined at the Laboratory but none was found infected with *P. pestis*.

*Hospitals Dispensaries etc*—The seventeen medical institutions maintained by Government include 5 Civil Hospitals and 7 Sick Rest Houses together with Constabulary Gaol and Mental Hospitals and a Leper Colony. The record of work carried out at these centres during the year reads—

	5 Civil Hospitals	7 Sick Rest Houses	Other Institutions	Totals
Admissions	3 108	734	390	4 250
Total In patients treated.	3,208	779	588	4,575
Hospital Deaths	205	24	30	259
Out patients new cases.	21 723	?	6 402	28,125
.. total treatments	49 832	?	23 454	73,286

Thirty-one Europeans were treated in the European Wards at Sandakan and Jesselton with no deaths.

At the 13 *Government Dispensaries* each in charge of a qualified dresser cases dealt with numbered 121,527 and the three *Travelling Dispensaries* treated 5 002 new cases during the year at these centres total treatments numbered 218 422.

Weekly and quarterly clinics are held at a number of centres in the State while during the extended tours of special areas made by District Surgeons from time to time treatment clinics are held at selected villages during the course of the itineraries.

Two examinations for Hospital Dressers were held during the year nine dressers employed by Government and two in private employ sat and four qualified for promotion in the Service.

The following notes briefly summarize the principal references in the Report to morbidity experience during the year under review—

Hospital admissions for *malaria* numbered 630 and hospital deaths due to this cause 28 malaria was therefore responsible for approximately 15 per cent. of all hospital cases and 11 per cent. of all hospital deaths. The numbers of persons suffering from malaria and treated as out patients at hospitals and dispensaries are not stated. It is noted that among 2 405 blood films received from Government



Hospitals and dispensaries and examined at the Laboratory 468 were positive for malaria parasites. Among the positive findings, *P. falciparum* infections were responsible for 33.9 per cent., *P. vivax* 53.8 per cent., *P. malariae* 8.9 per cent. and mixed infections 5.6 per cent. On four occasions during 1935 when on tour Dr J. C. T. TREGAETHEN District Surgeon, Interior Residency recorded the following results of his examination of natives —

Number examined	With enlarged spleens	Per cent
(a) 1,614	633	62.4
(b) 8,039	5,823	97.4
(c) 4,125	3,820	92.6
(d) 2,312	2,280	99.6

Six cases of blackwater fever with one death were reported. *Beriberi* was responsible for 164 hospital admissions with 12 deaths. Of the total patients admitted 38 were from Sandakan Town and 28 were Constabulary cases. As regards the former it is pointed out that the majority were labourers from outlying logging camps who gave lodging house addresses in Sandakan on admission. The Constabulary cases were all of mild type. On enquiry it was found that the rice issue was highly polished beriberi-producing rice if eaten without other foodstuffs producing an adequate supply of Vitamin B. A new diet scale was issued and no further cases occurred.

Cases of dysentery admitted to Government Hospitals numbered 227 (type of infection not differentiated but we understand this has always been found to be amoebic) and 15 deaths were ascribed to this cause. Pulmonary tuberculosis and pneumonia 77 cases and 30 deaths. At the laboratory 78 out of 499 specimens of sputum examined gave positive results for *Mycobacterium tuberculosis*.

During the year 12,247 vaccinations against smallpox were performed with successful results in 80.5 per cent of the cases. No case of any dangerous infectious disease was reported in the State during 1935.

**Helminthiasis** — The campaign against ankylostomiasis inaugurated in 1921 by the Rockefeller Institute continues under the supervision of Dr C. H. LAGER and a special staff. All Government servants, school-children and certain classes of employed estate labourers are examined twice yearly for hookworm infection and, if necessary given treatment. In Sandakan and Jesselton where 8,236 persons were examined the infection rate was 5.7 per cent. In other areas total treatments numbered 18,508. The Laboratory Report tabulates the findings among 3,684 faecal specimens examined. Among the positive findings ancylostome ova alone were present in 231 cases ancylostome with ova of other parasites 238 ascars alone 564 ascars with other helminths 315 *E. histolytica* alone 303 and with other intestinal parasites 21.

**Leprosy** — During the year there were 8 admissions to the Leprosy Settlement. 6 patients died, 2 absconded, and one was discharged. Seven of eight admissions were Chinese, the eighth a male Dusun.

At the end of the year 69 patients remained in the Settlement. Treatment is by weekly intramuscular injections of hydriocarpus oil with creosote. At the Laboratory among 22 nasal smears 8 were positive and 14 smears from nodules gave 4 positive with *Mycobacterium leprae*.

The *Venerical Diseases Clinic* established in Sandakan in 1927 continues to function with success. *Syphilis* is said to be uncommon but *gonorrhoea* is extremely prevalent especially in some interior districts. During the year 22 new cases and 79 repeat cases were treated for syphilis and 37 new cases and 119 repetitions for gonococcal infections. Urethral and vaginal smears examined at the laboratory numbered 1 675 and 195 respectively. 990 of the former and 59 of the latter being positive with the gonococcus. On three occasions when travelling in the interior Dr Tregarthen found that 837 out of 1 254 smears examined gave positive results i.e. an infection rate of 66.7 per cent. the rates ranging in the three areas from 57.4 to 77.4 per cent. Of the 7 162 cases of *vours* treated during the year 6 687 are recorded as new cases.

*Scientific*—The Laboratory Report contains an unusual amount of detail relating to the year's work. Under such headings as *malaria*, *helminths*, *leprosy*, etc. in the preceding notes brief mention has been made of the specimens received and examined and the principal findings recorded.

During the year under review an investigation into the native health was in progress under the direction of Dr J. O. SHIRLORE the terms of reference being—

(1) Generally to study the sociological and economic conditions under which the people live and all matters relating to the health, morbidity and mortality of the population with special reference to mother and child.

(2) To submit a report making at the same time recommendations calculated to promote the well being of the Native and counteract the influence of any dysgenic at play.

A report of the results of this enquiry will be available in due course.

*Financial*—Total expenditure on Medical Department services during 1936 amounted to \$161 487 as compared with \$161 068 in the preceding year.

P. Granville Edge

### UGANDA PROTECTORATE (1936)

The Uganda Protectorate lies in the northern part of the Great Lakes region of Africa. It has no sea coast, being bounded by the Anglo-Egyptian Sudan on the north, Kenya Colony on the east, Lake Victoria Nyanza and the Tanganyika Territory on the south, and the Belgian Colony on the west. The area of the Protectorate is estimated at 94,204 sq miles including 13 616 sq miles of water. (The area of England without Wales is a little over 50 000 sq miles.) The headquarters are at Entebbe and the chief commercial towns are Kampala and Jinja. All three are on or near the north shore of Lake Victoria.

*Vital Statistics*—The principal data are set out in the Table on the following page.

If the registration figures are to be trusted the population of the Western and Northern Provinces is increasing more rapidly than the other Provinces.

Province	Estimated Population	Reg'd Births	Birth Rate	Reg'd Deaths	Death Rate	Infant Deaths	I.M.R.
Hoganda	884 175	20 483	23.2	16,600	18.6	1,818	88.8
Eastern	1 183,368	31 510	28.6	29 629	25.1	6,293	199.9
Western	734 196	20,232	27.6	11 191	15.2	2,451	111.1
Northern	789 480	22 865	28.7	12,123	16.4	4,525	197.5
Protectorate Totals	3,603 15	93 194	28.4	70,600	19.6	15 102	153.6

*European Officials* resident numbered 570 with an average number resident of 462. One was invalided but no deaths were recorded. *Malaria* was the most common cause of illness. Among *European Non-Officials* 2,330 cases of sickness were treated by Government Medical Officers, *malaria* accounting for 452 cases and *typhoid* for 142 deaths within this group numbered 21. *Asiatic Officials* resident numbered 367, average number resident 306, six were invalided and one died. *Malaria* was responsible for 340 cases of sickness. The Government Medical Staff treated 7,024 cases of illness among *Asiatic Non-Officials*, *malaria* heading the list with 2,278 cases, 88 deaths were recorded, 28 being due to *blackwater fever*, 12 to *malaria* and 17 to *pneumonia*.

*African Officials* (African Civil Service) resident numbered 178. There were no invalidings, but one death was recorded due to *pneumonic plague*.

*Maternity and Child Welfare Work*—This work grows increasingly popular and the appointment of European Nursing Sisters to every district hospital in the Protectorate with the exception of four has made extensive developments possible. At the close of the year there were seven rural maternity centres under direct Government control in addition to the numerous dispensaries and clinics undertaking ante- and post-natal welfare work without providing beds for confinement. During the year under review 16,699 women made 63,477 attendances at established centres for ante-natal supervision, 1,859 confinements were conducted at hospitals and maternity centres, and 1,732 babies were born. The maternal mortality rate for the Protectorate as a whole was 12.3 per 1,000 births, the highest rate being recorded in the Northern Province with 17.4 per 1,000 births and the lowest in the Western Province where the rate was 8.1 per 1,000 births. It is pointed out that the maternal mortality rate is raised by pregnant women who seek hospital admission as a last resort when unskilled efforts outside have failed—in these circumstances it is not surprising to read that so many of these women die. *Midwives* on the registers at the end of the year were European and Asiatics 69, Africans 220.

At the *Lady Coryndon Maternity Training School* 41 students were in training, 17 sat for the certificate of the Uganda Midwives Board, and 15 were successful. 77 midwives, six of these in training for general nursing, were in service during the year. Admissions to the clinical wards of the School numbered 599, confinements 392, 310 live births and 24 maternal deaths were recorded. The Outpatient Department dealt with 3,739 expectant mothers and 869 infants brought up for post-natal supervision. No new country centres were opened owing to lack of funds, but at the 22 existing centres

records of work include 1 431 confinements live births 1,380 infant deaths 56 maternal deaths 9 ante-natal cases 10 844 child welfare attendances 12 702 and total outpatient attendances 67 716

The Report of the *Nsambya Maternity Training School* states that a new maternity hospital accommodating 22 patients was built during the year and improvements made to existing buildings in Nagongera and Ngoma. At the Nsambya Centre 30 students were in training five sat for and were successful at the examination of the Midwives Board. Patients admitted to the clinical wards of the Nsambya School numbered 314 confinements 237 live babies born 201 and maternal deaths 8. The 17 country centres confinements totalled 1 693 live births 1 616 infant deaths 19 and maternal deaths 21 there were also recorded 4,838 new ante-natal cases 1 651 attendances at infant welfare clinics and 36 180 outpatient attendances.

*School Hygiene*—Frequent visits to schools continue to be made by Medical Officers and their assistants. A frequent anomaly reported was the complete absence of sanitary accommodation for pupils even though the teaching of hygiene figures prominently in the School curriculum. Owing to lack of funds improvement is slow but it is reported that in the secondary schools and larger primary schools latrines are now provided. Schools often fall short of the ordinary standards of ventilation and lighting dormitories are overcrowded and the rooms not maintained in the state of cleanliness desirable. The elementary sanitary requirements for schools embodied in the draft School Health Regulations as finally adopted by the Advisory Council on Native Education are printed as an Appendix to the Report under review. The medical inspection of school-children was carried out in a number of districts dental caries and trachoma being reported as particularly prevalent. Height and weight measurements of Buganda schoolboys were recorded by Dr A G MACKAY of Masaka. Milk is to be issued to the school-children in Mengo District under the supervision of the Medical Officer who will record the results of this dietary experiment.

*Public Health Sanitation etc*—The Report records a year's work resulting in slow and steady progress made. The powers provided by the Public Health Ordinance 1935 enable the authorities to frame and enforce rules for health betterment the consolidation and simplification of various regulations formerly in force the new draft building drainage and other regulations in course of preparation are discussed at some length.

The water borne *sewage scheme* for the commercial area of Kampala was commenced during the year and it is hoped the work will be completed by the end of 1937. The single bucket system continues to be employed in the larger townships and is gradually being extended to smaller centres of population. At schools factories etc. deep pit latrines are the usual rule. With regard to *water supplies* the duplication of the pipe line for Kampala was commenced and Government has also approved the provision of piped supplies to Entebbe and Mbale. In rural areas sanitary inspectors continued to assist Native Authorities in the improvement and protection of local supplies.

Questions concerned with labour received special consideration. The New Rules under the Masters and Servants Ordinance were published for general information during the year only to be met with great opposition from employers of labour who objected to the clauses concerned with housing diet and hours of work. The growth

of insanitary housing conditions in trading centres and large towns complicates the problems of public health administration. The dangers of uncontrolled exploitation of land for building purposes are discussed, and steps taken to deal with these matters are described. The slum area in Jinja Township was cleared during 1936 all buildings being destroyed and the area burnt over—model dwellings in *pro-prietary* will be erected. The standard of housing for the African is said to have improved considerably in recent years—in small townships the standard of the Asian bazaars is said still to be bad.

Legislation dealing with the control of food supplies and vendors of food is in course of preparation and regulations to ensure the production of reasonably clean milk at dairies are also projected. A combined agricultural and health survey of two areas was undertaken during 1938 and the results of the investigation published under the title 'The Agricultural Survey Committee Nutrition Report No. 1—Teso'.

*Propaganda etc.*—The most successful Welfare Exhibition yet held in Uganda organized by the Provincial Administration with the co-operation of the Medical, Agricultural, Veterinary and Education Departments was held at Lira in the Lango District. It is believed the lessons resulting from this exhibition will give great impetus to ordered sanitary development and improved health and efficiency not only in the district but also in the Northern Province as a whole. The various exhibits etc. are described in detail in the Report under review.

*Training of Sanitary Personnel*—In January 1936 the Instructor of Hygiene made a commencement with the systematic training of Africans for employment as Health Orderlies or Sanitary Inspectors. The whole course will cover two years and eight months and a high standard of knowledge and efficiency is aimed at. It is hoped to arrange for Africans thus trained to be examined by a Joint Examining Board for all East African Territories and the certificate of this Board to be recognized by the Royal Sanitary Institute. The training of Nursing Orderlies, Dispensers etc. is discussed in the section 'Uganda Medical School' below.

*Hospitals, Dispensaries etc.*—During the year a comprehensive list of requirements for existing and projected hospital and dispensaries covering the next five years was prepared and submitted for Government consideration. The principal establishment changes in 1936 included the increase of nursing sisters from 20 to 25 and of Asiatic nurses from 4 to 5. The post of Asiatic Surgeon was abolished, the number of Sub-Assistant Surgeons reduced from 15 to 12 and the increase of Senior African Medical Assistants from 22 to 23.

At the end of the year there were 4 European, 9 Asiatic and 23 African Hospitals and in addition 93 (an increase of six) Dispensaries and Dressing Posts. The record of work carried out at these centres is shown in the Table on the following page.

Summarizing the principal items of morbidity experience during 1936 we have the following—

*Malaria*—Since 1932 the numbers of cases and deaths ascribed to this cause have progressively increased. During 1936 total cases of malaria treated at various centres numbered 71,407 and of these 31,656 (in the Hospital Returns totals read 33,607) were treated in station hospitals and 39,751 in dispensaries. The increased incidence was general throughout the Protectorate though squallent in the

Hospitals etc.	Beds	Patients Admitted	Total Treated	Hospital Deaths	Out patients New Cases	Out-patient Attendances
4 European	34	517	—	—	442,573	1 070 108
9 Asiatic	56	1,345	—	—		
23 African	1 273	29,215	—	—		
83 Dispensaries etc.	529	?	—	—	643 697	2,024 721
Totals	1 892	31 077	32,165	1,833	1 086 570	3 094 829

Northern Province and highest in the Eastern Province. A great part of the increased incidence occurred among the large numbers of immigrant labourers who arrived in greatly debilitated condition and further the early months of 1936 were unusually wet with the result that there was an increase in the numbers of mosquito breeding places. Among the 33 607 in and out patients treated at station hospitals 20 166 were defined as clinical malaria. Of the remainder 1 269 were *benign tertian* 1 531 *quartan* 10,276 *subtertian* 307 mixed infections and 58 malarial cachexia. There were 142 hospital deaths due to malaria. At the Laboratory where 12,518 blood films were examined for parasites 585 contained *P. malariae* 2,941 *P. falciparum* 65 *P. vivax* 64 mixed infections and 440 malaria parasites species not identified.

Of *blackwater fever* 63 cases with 14 deaths were reported by Government Medical Officers and 96 cases with 16 deaths by private practitioners a total of 159 cases and 30 deaths in the Protectorate. The distribution of cases and mortality reads European 8 cases 2 deaths Asians 141 cases 26 deaths Africans 10 cases 2 deaths. During the past four years there have only been 40 cases among Europeans as against 539 among Asians. Among Africans appears the first recorded case in a female.

Malaria control work included drainage filling in wells and depressions reclamation of potential anopheline breeding places and anti malarial swamp planting. It is stated that Africans trained in searching for mosquito larvae and adults and capable of identifying the commoner species are now available in most towns and have assisted considerably in control measures.

*Yellow Fever*—Blood samples taken from people living in the Northern Province were sent for examination to the Rockefeller Foundation Laboratory New York. The sera of four were found to show immunity to yellow fever and nine of these bloods also showed immune bodies to Rift Valley Fever. Five out of 22 samples of blood from forest monkeys in the same area showed protection seven out of the eight specimens of blood from oxen showed immunity but the blood of sheep and pigs was negative. Viscerotomy was issued to nearly all stations but in no case did liver tissue examined show any of the changes characteristic of yellow fever (see this *Bulletin* 1937 Supp. p. 48\*). As the presence of *Aedes aegypti* has been reported from every township of any size in the Protectorate special efforts are directed towards the reduction of the numbers of this mosquito.

As a result of the attention which the subject of yellow fever received at the Pan-African Conference in 1935 and the subsequent visit of Dr SOPER of the Rockefeller Foundation (see this *Bulletin*

1937 Supp. p. 48\*) the Foundation decided to send a mission to Uganda to investigate the whole position. A team of workers under the direction of Dr. A. F. MAHAFFY arrived in October the laboratory previously occupied by the Human Trypanosomiasis Institute was placed at their disposal and research work was to commence as soon as necessary building alterations had been completed.

Recorded cases and deaths due to *plague* were 880 with 929 deaths, as compared with 2,010 cases and 1,871 deaths in the preceding year. The whole of the Western Province was free from the disease one district was affected in the Northern Province, two in Buganda Province but cases occurred in every district in the Eastern Province, where 637 cases and 595 deaths were recorded. The anti-plague measures in use in Busoga (referred to in this *Bulletin* 1937 Supp. p. 49\*) appear to have been successful and their introduction to other districts is under consideration. At the Kampala laboratory the carcasses of 1,570 rats were examined, 4 being found infected with *P. pestis*. The Government Entomologist reports that the investigations into the relation between plague and cotton crop were continued, results showing no evidence of the alleged correlation. Two male ferrets were imported from England for experimental use in the destruction of rats.

Cases of *relapsing fever* declined from 656 in 1935 to 493 in 1936. Of the total cases recorded 238 occurred in the Western Province 274 were treated as hospital in-patients and 19 died. Only 2 non-fatal cases of *typhus* were reported and it appears that the universal use of the Carnie disinfectant (see this *Bulletin* 1936 Supp. p. 47\*) has proved most successful in eradicating the disease. The disease persists, however outside the Uganda border and the importance of maintaining the apparatus in use is emphasized. A very considerable reduction in the incidence of *cerebrospinal meningitis* is noted 360 cases with 130 deaths as compared with 1,318 cases and 469 deaths in the preceding year. The methods of individual segregation practised appear to have been at least as successful as the policy of prophylactic inoculation adopted in the Belgian Congo.

As reported in the 1935 Report an imported case of *smallpox* was discovered in Kampala during the latter part of December (see this *Bulletin* 1937 Supp. p. 49\*) and in spite of wide-scale vaccination and isolation of discoverable contacts further cases occurred among the native population. During the first three months of the year 32 cases with 5 deaths were recorded no case occurring after the third week in March. An intensive vaccination campaign was embarked upon 1,223,920 vaccinations being performed and the disease stamped out.

*Trypanosomiasis*.—During the year under review 1,927 cases (as compared with 675 in 1935) were recorded with 58 deaths. It is believed a very large part of the increase may be attributed to the more extensive and stricter examinations carried out in the West Nile area, where 1,867 new cases were discovered. The Uganda shores of Lake Victoria are now said to be free except where the Protectorate boundary adjoins that of Kenya, and here it is impossible to determine whether the infection is kept alive by immigrants from that Colony or acquired by Uganda residents visiting Kenya—the boundary is purely artificial and it is impossible to prevent every person from crossing from either side of the border.

As regards control measures, reclamation of lake shores from tsetse infestations is the policy actively followed demands include the

clearing of foreshores for prescribed depths and widths sufficient to ensure complete protection from fly the proper siting of settlements control growth of crops gland examination of prospective settlers etc. It is hoped that controlled re-occupation will gradually render areas unsuitable for habitation by tsetse though it is pointed out that reoccupation except under strict controlled conditions might prove dangerous. In the West Nile area for example the movement of people with trypanosomiasis has resulted in the infection of a new river system believed originally clean.

In the Koich area (West Nile District) where the comparative value of attempts to eliminate fly by hand-catching or by debushing is under examination so far the balance of evidence is in favour of debushing. The Government Entomologist reports that during the year surveys covering a considerable portion of the Gulu district were carried out outstanding findings of these surveys included —(a) the low density of *G. palpalis* in most parts of areas surveyed (b) the wide distribution of *G. palpalis* in low concentrations west of a named road with (c) the presence of *G. morsitans* in some numbers in the northern area east of the road and (d) the discovery of *G. palpalis* in small numbers along a stretch of stream practically treeless but margined by tall elephant grass.

*Tuberculosis* was responsible for 490 cases of the pulmonary and 86 cases of other forms of the disease of the former 272 received treatment as hospital in-patients and 89 died while among the remaining 86 cases 52 were hospital in-patients and 52 died. Reported cases are fewer than in 1935 for during the year under review no dispensary records are included. At the Laboratory where 1 791 specimens of sputa were examined 1 735 related to Africans and of these 120 proved positive with *Mycobacterium tuberculosis*. Owing to the absence on leave of Dr CARMICHAEL, Assistant Pathologist at the Veterinary Laboratory, no further information as to the infection of human beings with the bovine type of *Mycobacterium tuberculosis* is available.

*Pneumonia* is a very fatal disease among Africans altogether 1 272 cases were treated and among 1 010 in patients 241 deaths were recorded. *Bronchitis* and *Broncho-pneumonia* gave rise to 10,838 cases of which 712 received in patient treatment and 86 died.

Government Medical Officers reported 73 cases of *enteric fever* distributed as to 68 *Bact. typhosum* 2 *Bact. paratyphosum B* and 3 unclassified all were treated as in-patients and 20 died. General Practitioners reported 7 cases but in none of these was the type of infection defined. Altogether 2,323 cases of *dysentery* were recorded of which 667 were amoebic 309 bacillary and 1,347 unclassified. Of the total 594 cases received treatment as hospital in patients and among these 49 deaths occurred.

*Helminthic Diseases* —It is stated that *ankylostomiasis* and *ascariasis* are common in every district in the Protectorate. Anti-helminthic drugs are regularly administered but until the use of pit latrines becomes much more common re-infections are almost certain to occur. *Taeniasis* is extremely common in the great cattle districts of the Western Province while *dracontiasis* is confined to the Nilotic districts of the Northern Province where special efforts are being directed towards the protection of rural water supplies. Recorded cases of infestation by intestinal parasites read —*ankylostomiasis* 1,940 cases *taeniasis* 1,990 *ascariasis* 808 *dracontiasis* 708 and 142 cases of rectal and 27 of urinary *schistosomiasis*. At the Government



Laboratory where 4,934 faecal specimens were examined (of which 4,317 related to Africans) 2,327 contained ancylostome ova, 579 trichurus 321 ascaris, 227 taenia 7 enterobius, and 18 *S. MANSONI*.

**Sexual Diseases.**—Cases of syphilis numbered 63 695 of gonorrhoea 14 101 and of yaws 62,240. The prevalence and distribution of these infections remains as previously described (see this *Bulletin* 1937 Supp. p. 50\*) It is stated that though patients of both sexes seek treatment attendance is spasmodic and rarely continued to cure.

**Leprosy.**—At Government Hospitals and Dispensaries 1 013 lepers attended for treatment. Results are said to have proved disappointing for patients rarely attended more than once or twice for injections. From Reports on the *Mission Leprosy Colonies* the following details have been taken —

Leprosy Colony		In-patients	Out patients
Buloba	Franciscan Sisters ..	80	7
Nyenga	..	150	80
Banyoni	C.M.S. "	590	7
Kumi Children's Home, Taso	..	276	3 720
Ougmo	..	407	4,000

Among other diseases commented upon in the Report under review mention must be made of the following. Patients treated for diseases of the eye totalled 14 783 and of these 2,519 were cases of trachoma. Trachoma continues to cause grave anxiety it is the cause of a great deal of blindness in the country and medical officers in all districts report an increase of this condition. Special attention is devoted to the disease, especially in the schools and dispensaries. Ulcers were responsible for 26,365 cases, one-half occurring in the West Nile area. It is stated the numbers would have been much larger if all cases treated at the dispensaries had been included. A good deal of work has been done in testing various methods of treating tropical ulcers. Elastoplast is too expensive to be used on a large scale in native practice and the most effective dressing so far seems to be the application of camphor liniment after removal of all necrotic tissue by a magnesium sulphate powder dressing or by scraping. It is of interest to note that Dr Forbes Brown was awarded the North Persian Forces Memorial Medal in 1936 for his paper on this disease.

**Report of the Uganda Medical School Mbulago.**—During the year the Joint East African Examining Board in Medicine was constituted, and held its first meeting. Syllabuses were revised and approved, regulations framed and examiners appointed. One of the most important decisions reached by the Board was to extend the period of clinical instruction from two to three years to allow for additional practical training. At the end of the year 34 students had qualified of these 29 are in the Protectorate service and two in the service of the Zanzibar Government.

Text-books for the training of nursing orderlies were prepared by Dr J. P. MITCHELL Medical Superintendent, and Miss R. A. BAGOT Lady Superintendent of Nurses. In the senior class 20 male orderlies sat for examination and 18 passed in the junior class 11 out of 13 were successful. The training of dispensers continues with seven students taking the course.

**Scientific**—The Report of the Laboratory at Kampala announces that 46 114 examinations were carried out during the year of the total 13 660 were blood examinations and cell counts 4,964 were urines 4,934 faecal examinations and 18 683 were Kahn tests The 267 samples examined in the Chemical Section comprised specimens received from the Medical Police Agricultural and other Government Departments and from Local Authorities. Many of the results of these Laboratory examinations have already been the subject of comment in preceding sections of this summary and further reference is unnecessary It should be pointed out however though it is stated that buildings equipment and staff are not designed for research work of elaborate type but for the maintenance of the ordinary routine services of the Department nevertheless useful research work is being done A study of the haematological characteristics of local natives was carried out by Dr HENNESSEY the results being published in the *East African Medical Journal* A nutritional survey was carried out in Teso and entomological surveys in Jinja and in Tororo Scientific papers published by members of the staff include —

HENNESSEY (R. S. F.) Haematological Observations on Natives of Uganda—*East African Medical Journal* Vol. 13 p 210

GIBBINS (E. G.) Congo Simuliidae.—*Annals of Tropical Medicine and Parasitology* Vol. 30 p 133

— Uganda Simuliidae.—*Transactions of the Royal Entomological Society* Vol. 85 p 217

— On a Melanic, Inland Race of *Anopheles costalis* Giles (Gambiae) in Uganda—*Annals of Trop Med and Parasitology* Vol. 30 p. 275

HOOPER (R. C. D.) & LOEWENTHAL (L. J. A.) A Survey of Health Work in Teso Uganda.—*Annals of Trop Med and Parasitology* Vol. 30 p 17

WILSON (W. A.) The Controlled Experiment in Medicine—*East African Medical Journal* Vol. 13 1936 p 164

**Financial**—Expenditure on medical services during the year under review amounted to £164 765 a sum which represents 9.6 per cent of the total revenue of the Protectorate in the same year

*P. Granville Edge*

### KENYA COLONY AND PROTECTORATE (1936)

Kenya Colony and Protectorate is in Eastern Equatorial Africa. It is bounded on the north by Abyssinia and the Sudan, on the west by Uganda, on the south by Tanganyika Territory and on the east by the Indian Ocean and Italian Somaliland. The total area is 224 960 sq miles and is divided into nine provinces Nyanza, Nzoia, Turkana, Rift Valley, Masai, Kikuyu, Ukamba, the Coast, and the Northern Frontier Provinces Its capital is Nairobi and Mombasa the principal port.

**Vital Statistics**—The position regarding vital registration remains unchanged (see this *Bulletin* 1937 Supp. p. 39\*) It is noted that the question of the institution of a satisfactory system of registration of births and deaths has been under review by Government during the year and the matter has also received attention from at least one Local Native Council. Dr A. R. PATERSON comments upon the difficulties attending public health administration etc. in the absence

of carefully recorded facts and quotes at some length from the Introductory Note prefacing the 1936 issue of this Supplement.

For Africans the estimated population in 1936 is given as 3 186,976 for Europeans and Whites 18 192, Indians 39 653 Arabs and others 14 458 and Goans 3,577 making the total population in the Colony and Protectorate 3,281,858

Registration is still so incomplete as to be practically worthless available records for 1936 show —

	Registered Births	Registered Deaths	Infant deaths
Europeans and Whites	295	144	Unmentioned
Africans and Others	48	1,500	"
Indians	435	448	"
Goans	107	19	"

*European Officials* resident numbered 1 796 with an average number resident of 1 412. During the year 9 were invalided and 6 died. *Non-European Officials* resident totalled 2,491 and the average number resident 2,126. Among these 12 were invalided and 3 died.

*Maternity and Child Welfare Work* is carried out by four main agencies viz (a) The Government Medical Department (b) The Missionary Societies, (c) The Lady Grigg Welfare League and (d) The Municipal Council of Nairobi, the three latter organizations receiving financial assistance from Government for the work carried out. Maternity work at various centres included the following —

	Maternity Cases	Midwives in Training	Midwives Qualified
Government and Local Native Council Hospitals, 16 Centres	1,278	18	5
Lady Grigg Welfare League, 3 Centres	758	4	1
Mission Hospitals, 8 Centres	1,009		2

At Government Ante-Natal and Child Welfare Centres in Mombasa, attendances totalled 33,203 and home visits by the staff 16,317. At the Eldoret Centre attendances were 3 609 and home visits 4 410. In Nairobi this work has been the responsibility of the Municipality since 1935. During the year under review attendances numbered 37,548 and home visits 12,532.

Special note is made of the successful work accomplished in rural areas in recent years and this is attributed to the fact that by the provision of female staff at hospital centres the confidence of African women and their husbands was obtained. Since 1928 special maternity wards at five hospitals have been erected by Local Native Councils.

*School Hygiene* — There is still no School Medical Service. In most native areas a considerable amount of work is said to be carried out by District Medical Officers and Sanitary Inspectors. At Eldoret, Indian and African schools were visited weekly. No details of these visits are supplied.

*Public Health Sanitation etc.* Dr A. R. PATERSON reports that the maintenance and administration of the many health services in the

Colony and Protectorate was even more difficult during 1936 than in the preceding year demands for relief increased greatly opportunities for constructive work were more numerous yet financial provision to meet these was no greater and the sanctioned strength of Medical Officers was 48 as against 50 in 1935 On the other hand it is gratifying to note that the report of practically every District Medical Officer refers to the increasing interest taken by Local Native Councils and by the people at large in public health matters. Dr PATERSON contributes a brief historical survey of the development of public health work in Kenya from 1921 to the present time and among other expressions of opinion emphasizes the importance of having prescribed facts regularly recorded if the progress of public health work is to be assessed with some degree of accuracy Such facts as are available suggest there is reason to believe that on the whole the health of the people may have been better during the year under review than in 1935 no unusually high incidence of any of the more dangerous infectious diseases nor of bowel or respiratory affections was recorded.

With regard to *general measures of sanitation* it is stated that the *pit-latrines* campaign continued to feature the general sanitary programme of the Department where staffs were available towards the end of the year the disposal of *night soil* and *refuse* by the Indore Composting method was tried out with success in one of the smaller townships. Antimalarial control measures were maintained as usual in the Kusumu area special works were undertaken with the financial assistance of a grant from the Colonial Development Fund. A considerable *housing and town planning* scheme for the improvement of one of the slum areas of Nairobi was prepared and a large amount of propaganda work carried out in the native reserves The routine inspection of *foods* markets dairies etc. continued as usual. In the native reserves food supplies were better with increase in the consumption of meat Over the country as a whole however dietaries are still far from satisfactory among the agricultural tribes the use of milk is not yet appreciated and the supply of green foods inadequate and irregular *Labour conditions* on the goldfields were on the whole satisfactory though employers of labour are not yet prepared to embark on housing schemes involving large capital expenditure.

Medical Officers and Sanitary Inspectors devoted attention to the instruction of people in the native reserves in the elementary principles of hygiene Health exhibits were staged at the Agricultural and Trade Shows at Nairobi and Mombasa and similar exhibits were organized by individual Missions (and on one occasion by an African headman) in a number of native reserves.

For financial and other reasons the *training of Africans as dispensary health workers* was discontinued during the year.

*Recommendations for future work*—The Report refers to the earlier recommendations with regard to research into the reactions to disease etc. of the African (see this *Bulletin* 1937 Supp p 40\*) The importance of improving the nutritional standards of the people through the education of males in agriculture and animal husbandry and the females in housekeeping is emphasized. The attention of local authorities is also directed towards the importance of improving housing conditions.

*Port Health Work*—Steamships entering at Kilindini or Mombasa during the year numbered 701 and dhows 1 489 A vessel from India arrived with a case diagnosed as smallpox no infected dhows were

recorded. The usual sanitary etc. control services in the port area continued to function satisfactorily. 4,833 rats were trapped and 634 dissected but all with negative results for *P. pestis*. The Port Health Officer has had placed at his disposal a small room where seamen can be treated for venereal diseases. Having regard to the amount of shipping activity, a properly equipped clinic is desirable.

Although there are three authorised aerodromes in Kenya there is no aerodrome designated as a "Sanitary Aerodrome" since permanent and adequate facilities at existing airports for the isolation of contacts, etc. are lacking though temporary arrangements could easily be improvised. Otherwise all the authorised aerodromes comply in all essentials with the requirements of the Convention. So far as aerial traffic is concerned Kenya stands in an important position. Up to the present yellow fever has never occurred in the territory, but on the eastern seaboard the climate is hot and moist and the incidence of *Aedes aegypti* is high. But the northern, western and central areas of the territory are natural barriers between the eastern seaboard and the infected or suspected areas lying to the north and west of the Colony and in view of these conditions a regulation requires all aircraft arriving from west of Long 32° 5' East must make their first landings at either Kisumu or Nairobi where the *Aedes* index is low. On arrival at these aerodromes aircraft are disinfected.

*Hospitals Dispensaries etc.*—Of the work in general the Report observes: "Our hospitals remain full to overflowing with cases of acute disease, our dispensaries crowded with patients of whom far larger numbers than can be accommodated are clearly in need of hospital rather than dispensary treatment. Patients treated at the various institutions during the year were: *In-patients* European 1,817 Asiatic and African 46,632. *Out-patients* European 3,609 Asiatic and African 408,788. At *Out-dispensaries* in Native Reserves 640,261 first attendances were recorded.

*Mission Hospitals* in receipt of grants-in-aid from Government dealt with 8,536 in-patients 137,802 out-patients and 80,951 dispensary patients.

The *training of Africans* as hospital assistants or male general nurses was carried on as usual at the Native Hospital, Nairobi. Twelve finished their training during the year and 21 learners were enrolled. Two of the three compounders who sat for the final examination were successful, three new entrants commenced training. It is hoped that at the proposed new native hospital at Nairobi, facilities may be provided for the systematic training of African women in general nursing.

The notes which follow summarize the principal items of morbidity experience commented upon in the Report under review.

*Malaria* in Kenya is endemic in all the warmer and low-lying areas and little change appears to occur from year to year. During the year 32,882 cases were treated in hospitals or at dispensaries other than out-dispensaries and of these 15,108 were defined as clinical cases, in 7,009 the type of infection was not defined. Of the remainder 707 were *benign tertian* infections 778 *quartan* 8,789 *subtertian* and 480 malarial cachexia. At the Medical Research Laboratory where 14,025 blood films were examined 1,680 were positive with *P. falciparum* 182 *P. vivax* 83 *P. malariae*. At the Mombasa Clinical Laboratory among 5,446 blood specimens 4,063 gave negative results among the positives were *P. falciparum* 1,020 *P. malariae* 53 *P. vivax* 19.

Twenty four cases of *blackwater fever* were recorded with 5 deaths. Malaria control measures have been the subject of brief mention in the section entitled *Public Health*. In Nairobi routine observations were continued and the Medical Officer of Health kept informed of breeding activity. At Mombasa where an extensive entomological survey is in progress *A. funestus* has not so far been found on the Island and only scanty findings of *A. gambiae*. In other areas general control work and mosquito surveys were continued.

So far as is known *yellow fever* has never occurred in Kenya but in view of the possible introduction of the infection through the medium of aerial traffic *Aedes* surveys have been made in towns along the air route. The *Aedes* index in Kisumu was found to be nil. Nairobi 0.19 per cent but Mombasa is seriously infested. Effective control measures are to be introduced (see also *Port Health Work* above). Except for one imported case *smallpox* was absent. 15 859 vaccinations were performed during the year. At the Medical Research Laboratory 1 657 447 doses of calf lymph were prepared and 1 552 739 doses issued. The Laboratory Report supplies Tables showing the history of each strain.

A sharp outbreak of *plague* gave rise to 139 recorded cases the Central Province being principally affected. It is said the true incidence of the disease was much higher than the verified cases would appear to suggest. In a number of districts steps were taken to clear and cleanse villages and improve village grain-stores with the result that more pasturage has become available and less cover for rats. These efforts continue.

*Cerebrospinal meningitis* though present in most districts throughout the year and the cause of considerable anxiety never assumed epidemic proportions. 319 cases were treated 296 of these as hospital in-patients with 162 deaths. Nine non-fatal cases of *typhus* were recorded all among Europeans and 6 non-fatal cases of *diphtheria*.

Of *enteric fever* the Report observes 195 cases were treated but Hospital Returns show 209 cases with 42 deaths. The distribution of types of infection among the cases being *typhoid* 174 *paratyphoid A* 5 *paratyphoid B* 7 and undefined 23. At the Medical Research Laboratory where 738 specimens of serum were tested for agglutinins of the enterica group 442 gave negative results 147 reacted positively with *Bact. typhosum* 2 with *Bact. paratyphosum A* and 15 with *Bact. paratyphosum B*. At the Mombasa Laboratory where 140 samples were tested 102 were negative positive findings being *Bact. typhosum* 27 *Bact. paratyphosum A* 3 *Bact. paratyphosum B* 5.

As regards *dysentery* in the text of the Report 2,211 cases are recorded, distributed as to 1,225 amoebic 89 bacillary and 897 undefined but Hospital Returns show a total of 2,234 cases of which 1,240 were amoebic 91 bacillary and 903 undefined as to type of infection. At the Medical Research Laboratory where 12 948 faecal specimens were examined 5 135 were negative the protozoon *E. histolytica* was found in 618 cases and at the Mombasa Laboratory the same organism was identified in 249 out of 3 885 specimens examined (1 179 negative). No special preventive measures were carried out for the dysenteries or enteric fevers.

Nine cases of *trypanosomiasis* were reported. The experiment of clearing riverine and lacustrine areas in South and Central Kavirondo was continued (see this *Bulletin* 1937 Supp. p. 43\*). The Medical Entomologist reports the elimination of *G. palpalis* along certain

rivers and the opening up of large acreages for cotton production as a result of this work. Trapping and hand catching of tsetse continue in the Port Victoria area.

According to Hospital Returns 1,560 patients were treated for *tuberculosis* though only 1,201 are mentioned in the text of the Report of the total hospital cases in- and out patients 858 suffered from the *pulmonary* form of the disease. No *ad hoc* preventive measures were carried out. At the Medical Research Laboratory 134 specimens of sputum were positive with *M. tuberculosis* among 1,200 specimens examined. The bacillus was also found in two urines and one stool and in two out of 183 samples of cerebrospinal fluids. At the Mombasa Laboratory *M. tuberculosis* was identified in 138 out of 474 specimens of sputum examined. Patients treated for *pneumonia* in Government Hospitals numbered 3,728 and 635 hospital deaths were ascribed to this cause. The Medical Research Laboratory Report contains an account of the research work on *pneumococci* carried out during the past six years. Over this period nearly 800 strains were typed and a vaccine containing the eight most prevalent types was produced. The value of this vaccine is being tried out on cases of pneumonia in H.M. Prison, Nairobi (see also this *Bulletin* 1936 Supp. p. 40\* and 1937 Supp. p. 43\*).

For *helminthic diseases* 51,029 persons received treatment. These comprised 40,496 cases of *taeniasis*, 9,318 *ascariasis*, 1,592 *ankylostomiasis* and 623 of *schistosomiasis*. Among the 7,813 faecal specimens giving positive findings at the Medical Research Laboratory 1,774 contained ova of *taenia*, 1,346 *ankylostomes*, 882 *ascaris* and 256 *S. mansoni*. At the Mombasa Laboratory among 2,066 positive findings results were of different order with ova of *ankylostome* 1,383, *trichuris* 1,241, *ascaris* 879, *taenia* 488 and *S. mansoni* 91.

Five hundred and twenty-eight cases of *leprosy* received treatment during the year.

Special clinics for the treatment of *venereal diseases* are held weekly for men at three centres in Nairobi and one in Mombasa for women five centres in Mombasa and one in Nairobi. Treatment is also given at all hospitals and dispensaries. The chief difficulty at all centres is to persuade patients to continue treatment after their more distressing symptoms have been relieved. Hospital Returns show that 8,448 cases of *sypilis* were treated, 3,883 of *gonococcal infections*, soft chancres 133 and *granuloma venereum* 3. Medical Officers of certain districts report with concern an apparently general increase in the incidence of gonorrhoea (see also this *Bulletin* 1937 Supp., p. 43\*). Persons treated for *yaws* numbered 12,253. At the Medical Research Laboratory where the Kahn reaction is used as a routine test for *sypilis*, 3,625 sera were received, 1,398 gave positive and 240 doubtful reactions.

Scientific.—Dr F. W. VINT, Senior Pathologist, contributes a comprehensive Report describing the activities of the Medical Research Laboratory. During the year 29,343 specimens of various kinds were received and dealt with. The principal findings in many cases have already been mentioned under such headings as *malaria*, *yellow fever*, *enteric fever*, *smallpox*, *pneumonia*, etc. in these notes. Among other Research work mentioned in the Laboratory Report reference is made to the studies of basal metabolism and energy exchange in Kenya natives which were commenced during the year and also investigations on the subject of nutrition.

Scientific papers published by the Staff of the Section of Medical Entomology include —

- SYMES (C. B.) *A. funestus* (Giles) as a " Domestic Breeder — *Annals Trop Med & Parasit* 1936 Oct 2 Vol 30 No 3  
 — & McMAHON (N. P.) The Food of Tsetse Flies (*G. swynnertoni* and *G. palpalis*) as determined by the Precipitin Test. — *Bull Ent Res* 1936 Dec  
 — & VANE (R. T.) The Eradication of *G. palpalis* from River Areas by the Block Method — *Rec Med Res Lab* No 7  
 ROBERTS (J. I.) — Plague Conditions in Urban Areas in Kenya — *Jour Hyg* 1936 Sept Vol 36 No 1  
 — Plague Conditions in Rural Areas in Kenya — *Jour Hyg* 1936 Sept. Vol 36 No 1  
 — The Carriage of Plague. — *Jour Hyg* 1936 Sept. Vol. 36 No 1  
 — & TONKING (H. D.) Notes on an East African Vesicant Beetle *Psephenus crebripunctatus* Epp — *Ann Trop Med and Parasit* 1935 Vol. 29 No 4

A résumé of the year's work carried out at the Clinical Laboratory Mombasa is also contributed by Mr W. L. TITMAN the Officer in charge. Here also the principal findings have been mentioned in the preceding notes making repetition unnecessary.

*Financial* — The sanctioned medical budget for 1936 amounted to £197 062 and actual expenditure £196,368 the latter approximating 5.9 per cent of the total estimated expenditure for the Colony and Protectorate.  
*P. Granville Edge*

### ZANZIBAR PROTECTORATE (1936)

Zanzibar Protectorate off the East African Coast comprises the islands of Zanzibar and Pemba and the islets within their territorial waters. Zanzibar is about 53 miles long by 24 miles broad with an area of 640 sq miles. Pemba to the north-east of Zanzibar is about 42 miles long by 14 miles broad. The only town of importance is Zanzibar Town.

*Vital Statistics* — The estimated mid-year population on the basis of which birth and mortality rates are computed was said to be 242 770. During the year 3 961 *births* and 4 092 *deaths* were registered the resulting birth and death rates being 16.3 and 16.8 per 1 000 respectively. In this connexion it should be explained that all data relating to the population births deaths etc. are assembled by the Mudiris and forwarded through the Provincial Administrations. That registration is faulty appears clear from some of the District records where birth rates range from 4.2 to 34.8 and death rates from 3.4 to 20.6 per 1 000 some of the figures carry little conviction. Certain vital surveys carried out in limited areas during the year produced results rather suggestive of the fact that the population if not reinforced periodically by an excess of immigrants over emigrants may be diminishing.

The *infant mortality rate* calculated on official records is given as 90 per 1 000 live births but it is believed that the true rate is in the neighbourhood of 200 per 1 000 live births (see this *Bulletin* 1937 Supp p 70\*)



After commenting upon the unreliability of prevailing data the Report observes: "It has been practicable elsewhere in Africa to obtain relatively accurate statistics relating to births and deaths and the achievement of the same standard should not be impossible in the Zanzibar Protectorate."

*European Officials resident* numbered 102 with an average number resident of 70. Two deaths were recorded. *Non-European officials* resident numbered 475 with an average number resident of 431. Among these 5 invalidings with no deaths were returned. The most common cause of sickness among both groups of officials were *malaria*, *influenza* and *diseases of the respiratory system* and of the *skin*.

*Maternity and Child Welfare Work.*—The intense conservatism of the people, the lack of tribal organization and the superstitious faith in witch doctors are among the factors combining to intensify the numerous difficulties facing the authorities in their endeavours to cultivate and develop these important branches of public health work. Yet despite all difficulties serious attempts are being made to cope with the disabilities so prevalent among women and young children in Zanzibar and 1936 saw the first Lady Medical Officer to be appointed in the Protectorate commence work with the assistance of a trained European Sister, a qualified Goan midwife, two African semi-trained nurses and other subordinates. Accommodated in special quarters daily clinics for women and children were held, an ante-natal clinic held weekly and infant welfare clinics twice weekly. All these activities are new ventures (see this *Bulletin* 1937 Supp. p. 70\*) and their immediate success so encouraging that by the end of the year plans were being considered for extending the scope of the work.

Work of the *Zanzibar Maternity Association* continued to be carried out along the lines previously described in these Summaries. During the year under review 475 women received treatment, 410 live babies were born and 7 infant deaths were recorded. At the dispensary conducted at the *Mwembeladu Maternity Home* 7,962 cases of various kinds were treated, ante-natal attendances totalled 2,016 and post natal 2,729.

*School Hygiene.*—Special attention is being devoted to the medical inspection and treatment of school-children. During 1936 the routine examination of the pupils attending 12 rural schools was carried out, when in addition to the usual physical examinations stools were examined for the ova of helminths, urines for the ova of schistosomes, blood smears were taken and examined for the presence of malaria parasites and the Kahn test applied to the serum of each pupil. The results of these examinations are set out in some detail, but for present purposes it must suffice to say that among 701 pupils examined in Zanzibar schools, 44 per cent. of Africans and 55 per cent. of Arabs were well nourished, 74 per cent. of Arabs and 36 per cent. of Africans were described as cleanliness good. Dental caries is common and most common among Arabs. Infection with *A. duodenale* and *ascaris* is almost universal, the number of pupils with malaria parasites in their blood is not unduly high. Twelve per cent. of Africans and 8 per cent. of Arabs reacted positively to the Kahn tests.

In the Pemba schools 370 pupils were examined. Standards of nutrition and cleanliness were not so high as in Zanzibar schools, but the results of other examinations showed no remarkable differences.

The newly appointed Lady Medical Officer examined 82 pupils in Government Girls' Schools in Zanzibar. This is the first time this

has been attempted and only the preliminaries had been completed by the end of the year enabling a few general remarks to be made.

Hygiene is taught in all Government schools but the results of medical inspections show that its practical application leaves much to be desired.

*Public Health Sanitation etc*—Dr S W T LEE Acting Director of Medical Services contributes as an Appendix to the Annual Report an interesting account of medical progress in Zanzibar during the past 25 years

Anti malarial measures in Zanzibar and Pemba are now a matter of steady routine As more funds and staff become available control will be extended beyond the town boundaries of Zanzibar and will include various swamps and streams which are at present the breeding places of anopheline mosquitoes In Pemba special difficulties are encountered by reason of the fact that townships are encircled by ravines and swamps and seepages are common.

Methods of *sewage disposal* remain much the same as previously described (see this *Bulletin* 1937 Supp p 72\*) In the native area of Zanzibar town the odoriferous pit latrines and sullage pits are the usual feature steady pressure is being applied to bring about improvements

In the rural areas of both Zanzibar and Pemba a recent sanitary survey showed that only about one house in seven or eight had a latrine Every effort is being made to emphasize the evil consequences resulting from the absence of these sanitary conveniences and to persuade the public to improve existing conditions in this respect The responsibilities of the Medical Department include the *scavenging* and *removal of refuse* in the towns of both islands no light task when it is observed that in Zanzibar town alone approximately 40 000 tons of refuse are dealt with each year

With regard to *water supplies* in Zanzibar all the Arab masonry conduits from springs supplying the town have been replaced by iron piping and except for a few wells on the town boundary town dwellers use the piped supply the quality of the water throughout the year being described as excellent The Chem-Chem springs were taken into the general supply and some 3 000 000 gallons are now available daily During the year a Paterson chlorinome was fitted at the Saatem Waterworks In Pemba and in rural areas sources of supply remain as previously described

The *sanitary inspection staff* comprises one European Sanitary Supervisor and 11 Asiatic and African Sanitary Inspectors These officials carried out their duties efficiently but it is felt their numbers are insufficient and the addition of four sanitary inspectors has been approved

In Zanzibar town *housing* conditions remain much the same as described in the preceding Report (see this *Bulletin* 1937 Supp p 72\*) except that efforts are being made to improve properties generally in the face of determined opposition from the owners In the native area an endeavour has been made to enforce such regulations governing hut siting as can be implemented without causing hardship and to ensure that houses are provided with adequate ventilation, light latrines etc In Pemba during the year the Medical Officer of Health assumed control of the building authority work in all townships In the rural areas of both islands, villages usually

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comprise a huddle of huts the chief need in rural housing lies in the provision of latrines (see above).

**Food.**—Rural health surveys carried out during the year leave no room for doubt that generally the population is under nourished. Coconuts, rice, potatoes and cassava form the basis of all African, poor Indian and working-class Arab dietaries. Most diets are deficient in proteins and fats. The Agricultural Department are endeavouring to improve the quality of local foodstuffs grown, and are also engaged in investigating the possibilities of using large areas of country for pasturing cattle in order that meat, milk, and animal fats may become more generally available.

**Health.** Exhibitions, lectures and demonstrations, propaganda through the medium of the Press, and distribution of pamphlets, etc., are among the practices adopted in an endeavour to spread the knowledge of hygiene and sanitation.

**Courses of training for Sanitary Inspectors and Dispensers** are being held and are meeting with success. Other grades including porters, mosquito searchers etc. are encouraged to attend night school and so merit promotion in the service.

**Port Health Work.**—During the year 563 ships and 582 dhows visited Zanzibar, 13,580 immigrants landed, and 13,858 immigrants embarked. No case of infectious disease was imported, and no ships or passengers were quarantined. Aeroplane traffic is said to have assumed larger proportions during the year but no details are supplied.

**Hospitals.** Dispensaries etc.—In Zanzibar Island there are six hospitals, a leper colony and 15 sub-dispensaries in rural districts. Pemba Island has 3 hospitals in towns and 7 sub-dispensaries and a leper colony in the rural districts. The record of work carried out at these centres (exclusive of the Mental Hospital, Leper colonies, Poor House) reads as follows:—Hospital admissions 4,413 total in-patients treated 4,961 hospital deaths 470 hospital out-patient attendances 236,128 at sub-dispensaries 223,042.

It is noted that the majority of persons attending for treatment at Government hospitals are town-dwellers, and that in remote rural areas the public rely mainly on the decoctions and enchantments of the local witch doctors. Among specific causes of sickness treated at Government centres during the year the following are selected for comment:—

**Malaria.** patients treated at Government Hospitals totalled 7,660 and 15 hospital deaths were ascribed to this cause. The distribution of types of infection among these patients reads 680 *Bewia tertian*, 31 *quartan*, 1,029 *subtertian*, 178 malarial cachexia and 5,739 clinical diagnoses. At the Pathological Laboratory where 8,643 blood films were examined 2,538 were positive for malaria parasites and 803 undefined plasmodia—the latter classification comprising parasites which could not be assigned to a definite species accurate determination being impossible owing to the smallness of ring forms. Positive *quartan* films showed a considerable increase by comparison with 1935 experience. In Zanzibar town where 1,825 cases of malaria were recorded, the incidence of the disease has declined considerably during the past three years. It is noted that 80 per cent. of the cases occurred among people resident on or near the town boundary outside which very little anti-malarial work has so far been possible.

Of *blackwater fever* 17 cases were reported with 2 deaths

Under *Public Health* in this Summary brief reference has been made to malaria control measures which continue along lines previously described (see this *Bulletin* 1937 Supp p 73\*) So far as preventive measures in rural areas are concerned it is stated that so far they have not proved very effective and that there is no suggestion that in Zanzibar any more than elsewhere any practical solution of the problem is in sight Investigations into the general malaria problems of the country are being conducted by Dr D D MCCARTHY and his staff and the results will be published in due course

*Plague* and *cholera* formerly loomed large in the history of Zanzibar but no cases have been recorded in recent years No rat proofing precautions exist but the matter has been raised by the Medical Officer of Health Meanwhile rats are trapped regularly during the year 21 631 rats were caught (11,254 in Zanzibar Town) and 915 spleen smears examined in the Laboratory but no evidence of *P. pestis* was found.

Although no case of *smallpox* was reported vaccination was speeded up during the year following news of an outbreak in Tanganyika Territory 15,230 vaccinations were performed. Only one case of *dengue fever* and that in a European in Zanzibar Town and none of *typhus* or *relapsing fever*

Only 8 cases of *enteric fever* were seen at Government hospitals but it is noted the Pathologist reports 30 positive Widal's out of 89 tests. In addition to the hospital cases 22 were reported by private practitioners the increase probably resulting from the prosecution of a private practitioner for failure to notify an infectious disease Of *dysentery* 50 cases with 4 deaths were recorded, the distribution of types of infection being amoebic 5 bacillary 26 and 19 unclassified. All were town cases. Water carriers are a potential menace by reason of their unsanitary habits and milk hawkers are a danger but control is becoming more effective At the laboratory cultures were made from faecal specimens in 125 cases of suspected bacillary dysentery resulting in the isolation of 19 *Bact. dysenteriae* Flexner and 4 *Sonne* *E. histolytica* was isolated in 8 out of 59 specimens examined.

*Tuberculosis* in Zanzibar usually implies *pulmonary infection* and during the year under review 204 of the 211 cases treated were of this form of the disease, while 49 out of 50 deaths ascribed to all forms of tuberculosis were due to phthisis. At the Walezo Tuberculosis Asylum where 94 patients were under treatment during the year 36 died and 32 were discharged, the Report observing there were no cases discharged cured.

*Leprosy*—The abolition of the Leper Decree in 1936 and its various restrictive clauses appertaining to infected persons has been followed by the development of the two leper colonies organized and administered along lines designed to attract lepers the present policy embracing in the terms of the Report attractive colonies fair treatment to individuals and no compulsion. With the abolition of the Funzi Island Settlement (see this *Bulletin* 1937 Supp p 74\*) an alternative colony for the use of Pemba lepers was established at Makondeni on high well-drained ground amid ideal surroundings. It is said that these colonies are popular new cases apply voluntarily for admission and no cases of desertion have been recorded. Details for the year read —

	Walero	Makondeni	Totals
Patients admitted 1936	23	12	35
Patients under treatment	62	65	127
Discharged	1	0	1
Died	9	8	17

Although specific treatment is given in some cases reliance is mainly placed upon good feeding healthy surroundings and a free life devoted to the cultivation of individual plots whose produce can be sold.

*Helminthic Diseases*—The only two of importance are *ankylostomiasis* and *schistosomiasis*. *Ankylostomiasis* is said to be "almost universal" in both islands and is a chief cause of disability. Every endeavour is made to bring home to the people the dangers of infection and how it can be avoided. Dispensers and sanitary inspectors in rural areas are devoting special efforts towards the installation of bore-hole latrines. *Schistosomiasis* is present in both islands incidence being especially marked in Pemba. The disease is said to be tolerated by natives to a remarkable extent—infected persons think nothing of passing bloody urine for years, even though many of them may live not distant from some dispensary or hospital. During the year under review 12,608 cases of *ankylostomiasis* and 550 of *schistosomiasis* were seen. At the Laboratory among 3,966 faecal specimens examined 1,587 were positive for *ankylostome* ova, other findings including *trichuris* ova in 535 cases and *ascaris* 168. Specimens of urine examined totalled 518 and of these 126 were positive findings for *S. haematobium*.

*Veneral Diseases*—Cases of *syphilis* treated during the year numbered 1,200 of *gonorrhoea* and its complications 1,568, and of *yaws* 4,689. According to official returns *gonorrhoea* incidence appears to have declined steadily, but *syphilis* and *yaws* have progressively increased during the past three years. Yet the Report observes that every male adult has, or has had, *gonorrhoea*. Local people attach little significance to the condition and do not attend for treatment unless the attack is unusually severe—in these circumstances recorded cases can scarcely indicate the actual incidence of the disease. At the Laboratory Kahn tests totalled 3,724 and of these 834 or 22 per cent. reacted positively.

*Other diseases* referred to in the Report include *ulcers* for this condition, 22,417 persons were treated, 50 per cent. of the total occurring in Pemba alone. *Bronchitis* and *broncho-pneumonia* were responsible for 6,242 cases and accounted for two-thirds of all affections of the respiratory system. The 3,566 cases treated for *diseases of the eye* included 620 cases of *trachoma*. Negligible numbers of cases of *chickenpox* and *measles* occurred but the precautions adopted were successful in preventing the spread of these diseases.

*Scientific*.—In the preceding notes frequent reference has been made to Laboratory examinations and their results. During the year there was a marked increase in the total number of specimens examined, the total of 21,484 including 8,643 blood films, 3,966 faecal specimens, 3,724 Kahn tests, 818 smears for the diagnosis of *gonorrhoea*, etc.

*Financial*.—Total expenditure on medical services amounted to £45,472, a sum which represents 9.6 per cent. of the total revenue of the Protectorate during 1936.

P. Grantville Edge

## REVIEWS AND NOTICES

ALGER. Fédération des sociétés des sciences médicales de l'Afrique du Nord VIIe Congrès. (Alger 22, 23 et 24 mars 1937) Typhus et pseudo-typhus Recueil des rapports communications et conférences. [Congress of Medical Societies of North Africa. Discussion on Typhus and Typhus like Fevers]—201 pp With numerous illustrations

This Congress under the Presidency of M V GILLOT Professor of Medicine in the University of Algiers took place in that city on March 22 23 and 24 1937 Delegates of the Faculties of Medicine from Paris Bordeaux Marseilles Lyons Lille attended also delegates from Tunis and Morocco Professor BRUMPT headed the Paris delegation The opening ceremony took place in the University and was presided over by Governor General LE BEAU the General Officer commanding the troops and the Mayor of the city were also present

Professor GILLOT then delivered his address of welcome to the delegates and introduced the subject of discussion namely Typhus and Pseudotyphus That is to say epidemic or historic typhus and other maladies which resemble it such as Japanese River fever Rocky Mountain fever boutonneuse fever etc. which are grouped under the term pseudotyphus Immediately after the President's address the sittings of the Congress were commenced.

On the first forenoon two reports were submitted the first by MM GAUD and BONJEAN on the Epidemiology of historic typhus in N Africa the authors were of opinion that the disease had been present before the French occupation Every year seasonal epidemics occur in Algeria in Tunis and in Morocco the maximum being reached in February to June according to the varying climatic conditions. The disease smoulders on between these outbreaks and in the opinion of the reporters the reservoir of the virus of true typhus is man himself

The second report by MM FERRARI and LIARAS was on the surgical complications of typhus such complications are met with in severe cases and may be caused by septic infections of the mouth or eyes or of the parotid gland. Gangrene of the limbs is also met with and one case in which the entire left upper limb became gangrenous is illustrated

In the afternoon Professor BRUMPT gave an interesting account illustrated by numerous slides of a Voyage to countries where typhus occurs and there followed a garden party at the summer palace of the Governor

On the second day the 23rd March two further reports were given MM DONATIEN and LESTOQUARD spoke of the Rickettsia of animals confining themselves to the parasites which affect domestic animals only and not man. Three of these have been discovered by the reporters themselves *Rickettsia canis* *R ovina* and *R bovis* these are transmitted by *Rhipicephalus sanguineus* *R bursa* and *Hyalomma* *Rickettsia ruminantium* the cause of heart water is found in the endothelial cells and is carried by *Amblyomma hebraeum* *R conjunctivae* of sheep is a parasite of the epithelial cells and is the cause of widespread infection

In his report on the human rickettsioses Professor BURNET reviewed the general morphology and biology of the rickettsia and discussed

the Weil-Felix reaction and the relation of the rickettsia to *Proteus X*. He suggested the following general classification of the Rickettsial diseases —

(a) The group of rickettsia of typhus transmitted by lice and fleas with 3 subgroups

(b) The group of which Rocky Mountain fever is the type with São Paulo fever and boutonneuse fever

(c) The group of which Japanese River fever is the type and which includes Malay scrub typhus

Trench fever and trachoma stand by themselves.

An interesting discussion on these two papers followed and it was claimed that Tabardillo of Mexico which had been placed apart should be included in the murine typhus group and that for certain reasons boutonneuse fever should be placed in group c rather than in group b as it is more closely related clinically to Japanese River fever than to Rocky Mountain fever.

In the afternoon an interesting historical account of the ancient city of Algiers and its inhabitants was given by Professors MARCAIS and Lefèvre PAUL, and the whole of the Report of the Congress is embellished by reproductions of beautiful pictures of old Algiers taken from the collection in the Museum of Antiquities.

On Wednesday, the 24th the last reports were submitted one by Dr. LEMAIRE on boutonneuse fever in Algeria.

The disease was first recorded here in 1927 and 27 cases have been reported up to date. Most of these cases occurred in people who were in contact with dogs infested with ticks but in some cases no such condition existed and it is suggested that some other animals such as small rodents may also be reservoirs of the disease in Algeria. The primary sore if found, is diagnostic but in the author's experience this sign is not by any means constant the feel of the rash is an aid to diagnosis. The virus has been isolated and studied and it conforms to that found in cases in France.

In the discussion that followed it was suggested that in the cases where no primary sore was to be found infection may have taken place through the conjunctiva or other mucous membrane.

Professor BLANC, Director of the Pasteur Institute of Casablanca gave a full review of the subject of vaccination against typhus and described his own methods and the good results which have followed the employment of his bile treated living vaccines.

At the last meeting of the Congress it was agreed that the next Congress should be held in 1938 in Tunis and that the subject of discussion should be Trachoma.

The closing banquet was held on the evening of the 24th in the Hotel St. George and was attended by 150 guests.

Several excursions were made out into the desert and to the oases some part of the way on camel back and the reporter describes this as "précédent l'infectable dislocation".

D. Harvey

WICKRAMASURIYA (G. A. W.) [F.R.C.P. F.R.C.S. (Edin.) M.C.O.G.]  
Malaria and Ankylostomiasis in the Pregnant Woman. Their  
More Serious Complications and Sequelae.—pp. xii + 179. With  
11 figs. 1937. London: Humphrey Milford, Oxford University  
Press. 70s. 6d.]

This essay which shared the Katherine Bishop Harman Prize for 1936 falls into the two distinct parts which its title suggests. It

deals with the writer's experience at the De Soysa Lying In Home Colombo

The great malaria epidemic of 1934-35 provided an unexampled opportunity for study of the maternal reactions to malaria and of pregnancy labour and the puerperium in their effect on malaria. Malaria is so prone to end pregnancy that pregnancy is no bar to its full treatment even by quinine which has a reputation none too soundly based for ending it. On the other hand labour may bring out of latency a malarial infection. In differential diagnoses pre-eclampsia is given special consideration in view of likeness of symptoms hypertension being held to be the deciding factor here as in all sections of the book the points made are brought out by case histories and in the matter of foetal death they show clearly that the child may occasionally be infected *in utero*. In treatment there is again insistence on the need to use quinine with courage plasmoquine being added atebirin not taking its place.

Hookworm infection is a greater menace to child bearing than is malaria. Of 273 deaths in the De Soysa Lying In Home 27 per cent were due to ankylostomiasis the next highest figure being 12.8 per cent from puerperal sepsis. Comparing women in whom hookworm infection was discovered with those in whom it was not certain of the grave complications discussed were 3 to 10 times commoner in the first than in the second group. Delivery if the mother lives means her improvement or her recovery—and her return from hospital to a place where in present conditions the getting of further hookworm infection is probably inevitable. The case histories in this half of the book are particularly illuminating for in the first it is not always clear how often this infection has been added to malaria. The definition of the microphotographs of smears showing malaria parasites is disappointing and a mis-spelling of *chenopodium* keeps catching the eye but the general material well deserves the usual fine setting of the Oxford University Press.

Clayton Lane

ZEISS (Heinz) [Prof f Hygiene an der Universität Berlin] & RODENWALDT (Ernst) [Prof f Hygiene an der Universität Heidelberg] *Einführung in die Hygiene und Seuchenlehre* [Introduction to Hygiene and Infectious Diseases] Second Edition enlarged—pp viii + 282. With 1 fig. 1937 Stuttgart Ferdinand Enke. [Unbound Rm 7-60 Bound Rm 9-40] [Review appears also in *Bulletin of Hygiene*]

In the first part of the book which deals with hygiene there is some interesting information about the new public health legislation of the third Reich and prominence is given to problems of heredity, sterilization and race. Industrial diseases are also discussed fairly extensively but very little is said about maternity and child welfare infant mortality hospitals school hygiene ventilation heating and lighting. The authors seem to have had a good deal of tropical experience and the second part of the book which deals with infectious diseases is more a synopsis of tropical medicine. On the whole the book is of some interest as it gives an insight into the present-day conception of various problems of public health in Germany.

H Lomas



TRANSACTIONS OF THE CAPE COAST HISTORICAL SOCIETY 1936.  
Oct. Vol. I No 1 35 pp. [5s.]

The tendency in the recorded history of Africa to over-emphasize incidents which Europe thinks of consequence in its relations with Africa and to ignore the many events and happenings which Africans themselves must hold to be of importance in the history of their country and their people is so marked that it is good to hear of the foundation on the Gold Coast of a local historical society which may go some way to righting the balance.

On May 30th 1934 a few people mindful of the great historical associations of the Gold Coast met together at the Senior Medical Officer's Bungalow Cape Coast and founded The Cape Coast Historical Society (1) to investigate any historical matter relating to the Gold Coast (2) to collect preserve and publish such records of the Gold Coast as may be deemed important (3) to establish a reference library of books papers and manuscripts relating to the Country and (4) finally to collate the traditional history of the Country and to reduce it to writing. By the rules of the Society Membership is made open to anyone irrespective of race and nationality who can show to the satisfaction of the Committee his interest in the history of the Gold Coast while the Committee's constitution is laid down as a Chairman Treasurer and Secretary and three ordinary members, of whom not less than two must be Africans living in Cape Coast or Elmina Districts. Thus, within the Society the African viewpoint has been assured its due place.

The first publication of the Society here noticed was issued in October 1936 and gives the Minutes of the first meeting and a statement of the Objects and Rules of the Society with a list of Founder Members. Then follow three papers read at the quarterly meetings of the Society. Dr N. A. DYCE SHARP Senior Medical Officer of the Gold Coast and Founder and first President of the Society fittingly begins the series with 'An Historical Sketch of Cape Coast from 1610 to 1728.' A paper by Mr Justice Strother STEWART on 'Anamabo its Castle and its People' comes next while for the third meeting Mr B. Y. OWUSU contributes a paper on 'The Rise of the United Ashanti.' The end pages are given up to Correspondence and Communications, and the letters there printed well illustrate the helpfulness of the Society in obtaining for an enquirer in the Gambia some detailed information about the life of his grandfather a Scottish merchant named William Topp who had resided in Cape Coast over 100 years ago.

R. L. S.

BUREAU OF HYGIENE AND TROPICAL DISEASES

# TROPICAL DISEASES BULLETIN

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[No 4

## MALARIA.

JAMES (S P) *Advances In Knowledge of Malaria since the War —*  
*Trans Roy Soc Trop Med & Hyg* 1937 Nov 30 Vol. 31  
 No 3 pp 263-278 With 2 maps 1 plate & 1 graph.

This is the presidential address delivered before the Royal Society of Tropical Medicine and Hygiene. The account it gives of malariological progress during the past twenty years is both interesting and encouraging. The author having contributed so much to that progress and having been so intimately connected with all the work he describes the reader obtains inside information as it were of developments that enable the public health worker of to-day to look forward to the eventual control of malaria more hopefully than seemed possible at the close of the war.

An account is given of the formation and of the work of the Malaria Commission of the League of Nations and of the great service it has rendered in bringing prominent malarologists of different countries in contact with each other. A tribute is likewise paid to the activities of the International Health Division of the Rockefeller Foundation in the field of malaria research and prevention. Reference is made to the opportunities for malaria research that were opened up by malaria therapy and to the advantages that were taken of such opportunities. The achievements of chemotherapeutic research into malarial remedies during recent years are referred to.

The second part of the paper deals with discoveries and additions to knowledge that have made the post war years noteworthy. Studies of the behaviour of the adult female mosquito in houses were the starting point which led to the discovery of biological races of *Anopheles* indistinguishable morphologically in the adult stage but with different rôles in the epidemiology of malaria. The recognition that the different species of the malaria parasite contain numerous strains having different biological properties was of great importance. On the chemical side the discovery of plasmoquine and other synthetic products is an outstanding chapter in malaria research. The study of avian malaria has been most fruitful. The discovery that some avian plasmodia have two schizogonic cycles of development in their vertebrate hosts one of which is in the reticulo-endothelial cells of internal organs, is of special interest. The study of malaria in monkeys has also been productive of notable additions to knowledge.

The last part of the paper deals with recent developments in connexion with anti-malaria measures their application and organization. A graph illustrates the fall in the incidence of malaria among British troops in India during the period under review.

From the nature of this interesting address a résumé can be but an incomplete list of contents.

Norman White

EDGE (P. Granville) *The Incidence and Distribution of Malaria in British Colonial Possessions.—Supplement to Trop. Dis. Bull.* 1937 Nov pp. 3\*-12\*

The author has brought together all the information obtainable in British Colonial Medical Reports about malaria prevalence in 1935. The combined population of British colonial territories, nine-tenths of which are wholly within the Tropics approximates 61 million. More than six and a-quarter million cases of malaria were treated at Government medical centres. This is about one-quarter of the total number of patients treated for all causes of sickness. Such figures give but scant information as to the extent of the ravages attributable to malaria. In many colonies, except in the main centres of population comparatively little is known of the malaria situation. The number of cases treated was proportionally far greater in the colonies in the Far East than elsewhere. In large measure this was due to the Ceylon epidemic—malaria caused 47 000 deaths in Ceylon in 1935 as compared with 2,333 in the previous year. Ninety-five per cent. of the cases recorded in Far East Colonies were reported from Ceylon. The only colonies from which no case of malaria was reported were—Barbados the Bahamas the Bermudas, Gibraltar Basutoland (where no anophelines have been found) Seychelles Rodrigues Island (Mauritius) Fiji and the Gilbert and Ellice Islands.

It is obviously quite impossible to give an adequate résumé of a paper such as this—it is itself but a résumé. The main fact that emerges from an interesting study is that our knowledge regarding the prevalence of malaria in the British Colonies and almost everywhere else as a matter of fact is appallingly limited.

N IV

MAXNEFFE *La prophylaxie du paludisme dans les troupes en campagne* (Conférence faite aux officiers de réserve du Corps de Santé le 28 avril 1937 à Hanoï) [*Lecture for Military Medical Officers on the Prevention of Malaria among Troops on Service.*]—*Bull. Soc. Méd.-Chir. Indochine* 1937 June-July Vol. 15 No. 6 pp. 590-611. With 1 chart. [11 refs.]

This lecture refers to the heavy toll that malaria has exacted from troops engaged in military operations in French Indo-China in the past, and gives a good account of the measures that should be taken to preserve the health and efficiency of such troops. Examples are given of the success attendant upon measures to control malaria among garrisons of posts in regions where malaria is hyperendemic. The value of quinine and of the synthetic drugs in the prophylaxis of malaria in such circumstances as these is adequately described. [The author ascribes to Patrick Manson the discovery of the rôle played by mosquitoes in the spread of malaria.]

N IV

CYPRUS ANNUAL MEDICAL & SANITARY REPORT 1936 [NEFF (E. A.) Director of Med Services] Appendix E. pp 44-54 With 1 chart—Extract of the Report on the Work of the International Health Division of the Rockefeller Foundation in Cyprus, 1936 [STRATMAN THOMAS (W. K.) BARBER (M. A.) & CARTER (J. C.)]

In 1936 one-quarter of the villages of Cyprus were surveyed. The spleen index of 10,367 children from 1 to 15 years of age was 22.8 per cent. The parasite index of 8,127 children was 27.4 per cent. There had been a relatively high malaria incidence during the summer of the previous year. *Vivax* infections predominated as was to be expected in a spring survey. Infections with *vivax falciparum* and *quartana* have all been found at altitudes above 4,000 ft. The spleen and parasite indexes are highest at altitudes of from 1,000 to 1,500 ft. The two rates follow each other closely at all altitudes up to 2,000 ft. Above this the parasite rate was considerably higher than the spleen rate.

*A. superpictus* and *A. elutus* are the two chief vectors in Cyprus. *A. bifurcatus* and *A. hyrcanus* are both common in winter and in early spring. They are probably of little importance in the transmission of malaria. Infected specimens of *A. bifurcatus* have been found in places in the Famagusta District where it is the only anopheline found; the malaria incidence is low. More than four fifths of the Island's malaria is due to *A. superpictus*. It breeds in mountain streams all over the island; it is not confined to high elevations, however, being found in rivers traversing the level plain. Adults have been found above 4,000 ft. Despite the lack of rainfall during the hottest months malaria transmission is at its height. The mountain streams are reduced to mere trickles of water but the small pools on the margins of these trickles offer ideal conditions for the breeding of *superpictus*. *A. elutus* breeds in marshes and its distribution in the Island is spotty. The extensive marshes near the shore in which it breeds extensively can be dealt with. The control of *A. superpictus* is a problem of much greater difficulty. Abundant production of both *elutus* and *superpictus* occurs quite early in the spring; there is no lag in the production of *superpictus* such as occurs in Greece. The sporozoite rates are highest from June to September. Infected *superpictus* have been found in March; these infections have probably survived in overwintering females. Infections of both species occur in May and June. A study of infants showed that the bulk of infections take place in the four months June to September; that autumn transmission does occur but to a much less degree than in the summer and that winter transmission is very low, probably nil.

The malaria problem of Cyprus is essentially a rural problem.

N. W.

SAUTET (Jacques) Quelques principes de lutte antipaludique en rapport avec l'endémie palustre et la biologie des anophèles. [Certain Principles relating to Antimalarial Measures with regard to Endemic Conditions and Biology of Anophelines.]—*Arch. Méd. Gén. et Colon.* 1937. Vol. 6. No. 6. pp 185-198. With 1 folding chart & 3 figs.

For successful anti-malaria work knowledge of the country of local endemic conditions and of the biology of the local anopheline

vectors are all necessary. The last two points are considered in this paper and illustrated from experience gained by the author as Director of the Antimalaria Centre of Bastia, Corsica. Though the paper contains nothing strikingly new or original it is well conceived and emphasis is laid on important considerations that are sometimes overlooked.

Nearly all malaria in Corsica is carried by *A. maculipennis* var. *labranchiae* and *clidus*. Their incidence is greatest in May and June thereafter their numbers diminish but rise again in September especially in years of heavy rainfall. *Pl. vivax* and *Pl. falciparum* infections are about equally prevalent. quartan infections are much less common. The spring cases are mostly benign tertian. The curve begins to rise in May or June and reaches its height early in August. Though many of the early cases have been infected in the previous year cases among foreigners and Corsicans coming from healthy parts of the Island show that infections early in the year do take place. Malignant tertian infections occur later their number is not very considerable till September the maximum prevalence being observed in October or November occasionally even in December. Quartan cases occur still later in winter more cases have been seen in January than in any other month. Gamete carriers become numerous about August and are found in considerable numbers up to January or February they are most in evidence in either October or November. Antilarval measures and drug treatment should therefore be carried out with special energy during late summer and in the autumn. As gamete carriers children and adult foreigners call for special attention and thorough treatment. The author regrets the lack of legal sanction for keeping foreigners in a malarious country under medical surveillance as they often play a rôle of importance in the dissemination of infection.

The second part of the paper deals with drainage and land reclamation schemes which should in all cases be based on detailed knowledge of the biology of the local vectors. In all such work the closest possible collaboration between the engineer and the malarialogist is indispensable.

N II

WATSON (G. I.) Some Observations on Mosquito Larvae dying in Anti-Malarial Oils and Other Substances.—*Ann. Trop. Med. & Parasit.* 1937 Oct. 22 Vol 31 No 3 pp 417-426. [12 refs.]

In published work on mosquito larvicides the criteria of death have received scant attention. Failure to wriggle when touched inability to reach and remain at the air surface, and the fact that the larvae were motionless and upside down have all been taken as evidence of death. Some such larvae may recover if carefully nursed. In this interesting paper the author shows that a more accurate measurement of the killing power of a larvicide may be obtained by noting the interval which elapses between the entry of oil into the breathing tubes and the moment when the heart muscle finally ceases to contract. Transverse heart muscle bundles are attached to the two tracheae and the tracheal movements are an easily observed indicator of the heart's activity.

After a drop of oil is placed on water in which a larva is swimming the time taken for a particular type of oil to penetrate the tracheal openings may vary from a few seconds to 10 minutes or longer. With

the more toxic oils the larva wriggles vigorously as soon as it touches the oil film. Having come into contact with one of these irritating oils the larva soon bends round to clean its tracheal openings with its mouth-parts—a performance which frequently precedes and apparently facilitates the entry of oil into the tracheae. With less toxic oils the heart may be beating 6 hours after oil has entered the tracheae with toxic oils the heart may stop beating in less than 2 minutes. The heart muscle rhythm is generally irregular for some time before the heart finally stops.

Three culicine larvae were placed under a film of non toxic oil and watched until it was seen that oil had just penetrated the syphon. They were then placed in fresh tap water and washed. Two of them subsequently pupated. Recovery has never been seen in any larva which had got even a minimal amount of a highly toxic oil into the end of one trachea.

A larva that is prevented mechanically from reaching the air surface will die. The time taken to do so varying with the amount of available oxygen in the water. During this process of asphyxiation changes in the rhythm and frequency of the heart pulsation may be observed.

Paris green does not act primarily on the heart muscle. It behaves in larvae as in man as a gastro-intestinal poison.

In addition to toxicity other properties of a good anti malarial oil are discussed its stickiness its power to burn vegetation its killing power in running water its cost and its reliability. N IV

BLACKLOCK (D B) Screencloth for Houses in the Tropics.—*Ann Trop Med & Parasit* 1937 Oct 22. Vol. 31 No 3 p 447

In 1935 the author published a paper under the above title in which he recommended a 14 mesh screencloth made of wire of 30 Imperial Standard Wire Gauge for the screening of buildings. Professor GORDON has recently shown experimentally that a certain proportion of *A. funestus* and of *Aedes* are capable of passing through this gauze. The author consequently points out that it is unsafe to use this large mesh gauze originally recommended as giving the maximum amount of light and air compatible with what then appeared to be safety without experimental proof of its efficiency in each locality.

N IV

FAUST (Ernest Carroll) Certain Factors in the Epidemiology of Malaria in the Southern United States.—*New Orleans Med & Surg J* 1937 June Vol 89 No 12. pp 692-694

Although endemic malaria does occur elsewhere it is only in the southern States that malaria is a compelling public health problem. With the exception of the Appalachian highlands the entire south as far west as a line drawn north-south through Dallas Texas is a vast malarious area. Everywhere *A. quadrimaculatus* is the important vector. The breeding of this species is closely connected with areas of limestone erosion. Statistical information regarding the amount of malaria in the States is very deficient. Morbidity data are lamentably poor and unreliable. It has been estimated that for each death caused by malaria there are at least 200 cases. In a recent health report from one State only two cases were reported for each death. The author states that haphazard diagnosis unscientific treatment and failure

to record and report cases are responsible for the scantiness of exact knowledge regarding the prevalence of malaria in the southern States. The importance of these matters should be impressed on medical students and post-graduates alike.

A II

AKASHI (Kazuyoshi) & YOSHIMURA (Takashi) Statistical Observations on 816 Cases of Malaria in Tainan District.—*Taiwan Igakkaï Zasshi* (Jl Med Assoc Formosa) 1937 Oct Vol 36 No 10 (391) [In Japanese pp 2248-2261 With 3 charts. [14 refs] English summary pp 2261-2262.]

In south Formosa the rainy season is from May to September the remaining months are almost rainless. Malaria prevalence is low from February to April, when the curve rises steadily till August. A fall in September is followed by a second rise. Benign tertian malaria is more in evidence than malignant tertian throughout the year except in the month of December when malignant tertian cases are more numerous. In other months *falciparum* infections are few. During ten years 816 cases of malaria were admitted to the Government Hospital at Tainan 6.8 per cent of total admissions. In a series of 490 cases albuminuria was observed in 36 per cent nephritis in 10 per cent. All the cases of nephritis were acute. The spleen was palpable in 47.7 per cent. of cases. In a series of 411 cases there were seven cases of malarial polymenitis. There were twelve fatal cases during the ten years a case mortality rate of 1.5 per cent. There were 27 cases of blackwater fever most of them occurring in the dry winter months eight of them died.

N IV

SOARES (Heitor de Albuquerque) A esplenomegalia na malária e seu valor epidemiológico. [Epidemiological Value of the Spleen Index in Malaria.]—*Hospital* Rio de Janeiro 1937 Nov Vol. 12, No 5 pp 837-840 [11 refs.]

This is a discussion of the value and limitations of the spleen index as a measure of the endemicity of malaria based on the author's experience in Brazil. It covers familiar ground.

N IV

GRUBB (Jos M.) Principles underlying the Protection of Outdoor Meetings from the Mosquito Pest and Methods of Application. *Proc 24th Ann Meeting N J Mosq Exter Assn New Brunswick N J* 1937 pp. 6-10 [Summary taken from *Public Health Engineering Abstr* Wash. 1938 Jan 1 Vol. 18. Signed James B LACEY.]

Experiments up to 1937 indicated that atomizing diluted emulsified kerosene pyrethrum extract until it saturated the atmosphere and covered such assembly areas as porches, halls, lawns or picnic grounds, protected gatherings against mosquitoes without human discomfort or injury to plant life. The prevention is due to repellency by the oil and contact killing of mosquitoes by the pyrethrins. A preliminary spraying of the area kills those present and if the wind moves the fog of spray out of the area a fresh cloud may be spread from the windward side as often as necessary. The type of atomizer—hand to power sprayers—depends on the size of area to be treated. Ten experiments, protecting gatherings of a few to 18 000 people on areas of 1 800 sq. ft. to 16 acres gave very favourable results.

COLLIGNON (E.) La campagne antipaludique de 1936 dans le département d'Alger [Antimalaria Campaigns in Three Departments of Algeria, Algiers, Constantine and Oran in 1936]—*Arch Inst Pasteur d'Algérie* 1937 Sept Vol 15 No 3 pp 383-397 With 12 figs on 6 plates & 1 chart.

AMBLALET (R.) Observations sur la campagne antipaludique de 1936 et sur les campagnes antérieures dans le département de Constantine—*Ibid* pp 398-410 With 6 diagrams & 6 figs on 3 plates

GOUGET (R.) La campagne antipaludique de 1936 dans le département d'Oran—*Ibid* pp 411-423 With 10 figs on 5 plates & 10 charts.

These three reports give a summarized account of the routine antimalaria work carried out in three departments of Algeria during the 1936 season. They all show that progress is being made in the control of the disease. In all three departments increased attention is being given to *Gambusia* as a larvicide. \ II

DE PALMAS & SAINZ Une campagne antipaludique dans un poste du Haut Tonkin. [An Anti-Malarial Campaign in Upper Tonking—*Ann de Méd et de Pharm Colon* 1937 Apr-May-June Vol 35 No 2 pp 575-584

This is an account of the measures that have succeeded in converting a very unhealthy military post in Tonking situated in an area in which malaria is hyperendemic, into a comparatively healthy station. In 1927 the malaria morbidity of the garrison amounted to 70 per cent of the strength the corresponding figure for 1935 was 7.3. This result was achieved by unremitting attention to sanitary measures: the clearing of undergrowth, levelling ground, small drainage schemes, oiling residual water, a general clean up in the neighbourhood of barracks and native dwellings, the use of mosquito nets and the prophylactic use of quinine. All this was carried out by local resources without special budgetary provision. \ II

BARBIERI (Antonio) Los procedimientos de lucha antipalúdica en la Argentina. Resultados hasta 1936 [Anti Malaria Campaign in the Argentine]—*Prensa Méd Argentina* 1937 Dec. 1 Vol 24 No 48 pp 2297-2305

BOYD (Mark F.) & KITCHEN (S. F.) Recurring Clinical Activity in Infections with the McCoy Strain of *Plasmodium vivax*—*Amer J Trop Med* 1937 Nov Vol 17 No 6 pp 833-843

During 4½ years 149 patients in the malaria therapy service of the Florida State Hospital had clinical attacks of vivax malaria following inoculations by anophelines. These were all infected with the McCoy strain. Twenty-one other patients were similarly infected with six other vivax strains. Of the former 45.6 per cent. experienced renewed clinical activity after cessation of the primary attack. Of the latter only one 4.7 per cent. had such an experience. It would appear that the frequency of renewed clinical activity after the cessation of the primary attack varies with different vivax strains. This paper deals exclusively with observations made on patients infected with the McCoy strain.



MAYNE (Bruce) Protracted Incubation in Malarial Fever. Report of a Case and a Review of the Literature.—*Public Health Rep* 1937 Nov 12. Vol. 52. No. 46. pp 1599-1607 [36 refs.]

On October 14th, 1935 the author obtained a suspension of *Pl. vivax* sporozoites ("Madagascar strain") from 4 *maculipennis* var *atroparvus* from the Horton Laboratory. The culture medium used was defibrinated human blood to which sodium dextrose 1 per cent., was added. The suspended culture was taken to the U.S.A. and on October 23th was inoculated into a patient. The first malarial paroxysm followed a year later October 6th 1936. He was under continual observation throughout this prolonged incubation period. There was no possibility of a reinfection. The malaria attack was a severe one. After seven paroxysms with maximum temperatures of from 105 to 106°F it was necessary to intervene and terminate the attack. Typical *vivax* parasites were found in the blood. This is the first case of experimental protracted incubation reported from America.

The author gives an interesting summary of the literature of protracted incubation or long latency of malaria most of which has been noted in this *Bulletin* V II

D AKTONI (Joseph S) *Plasmodium ovale*—New Orleans Med & Surg J 1937 June Vol. 89 No 12 pp. 691-692.

This is a concise description of *Pl. ovale* with special regard to the points which distinguish it from *vivax* and *malariae*. No case of *ovale* infection has as yet been reported from the United States.

V II

AKASHI (Keruyoshi) & NAKASHIMA (Yoshio) Henry's Melano-flocculation in Malaria.—*Taiwan Igakkaï Zasshi (Jl Med Assoc. Formosa)* 1937 Nov Vol. 36 No 11 (392) [In Japanese pp 2533-2544 [85 refs.] English summary p. 2545]

Henry's reaction was positive in 117 cases of malaria out of 125 examined. The 8 patients who gave a negative reaction were early cases, the 4th or 5th day of fever. A positive Henry's reaction was noted in catarrhal jaundice. Cases of hepatic cancer with jaundice gave a negative reaction. Three cases of ? undulant fever gave a positive reaction as did 4 out of 14 cases of evanthematic typhus. 5 out of 25 cases of typhoid fever and one case of pernicious anaemia. A slightly positive reaction was obtained in two out of 11 cases of syphilis. The authors consider that melanin acts merely as an indicator and not as an antigen. Even though positive reactions do occur in diseases other than malaria they consider Henry's reaction to be of great use in the diagnosis of malaria.

N IV

RAYNAL (J) La réaction de Henry au Tonkin. Résultats de 853 mélanoflocculations [Results obtained in 853 Henry's Reactions in Tonking].—*Arch Insts Pasteur d'Indochine* 1937 Apr Vol 7 No 25 pp. 27-35

Henry's reaction was carried out in the case of 500 individuals of whom 120 were healthy. 121 were suffering from diseases other than malaria, 68 individuals had a positive Bordet Wassermann reaction,

106 were harbouring malaria parasites in the blood and the remainder had suffered or were suffering from malaria though no parasites were found. As a result of this experience the author considers the reaction to be of diagnostic value in cases of malaria in which parasites are not found in the peripheral blood. In non-malaria cases which give a strongly positive Bordet Wassermann reaction a positive Henry's reaction not uncommonly occurs. This is a point to be borne in mind. In the choice of donors for blood transfusion especially in tropical countries a melano-flocculation reaction as well as a Bordet Wassermann reaction should be carried out. Henry's reaction is a useful indication of the success of treatment of malaria. The reaction becomes negative under the influence of judiciously applied treatment.

N II

FAIRLEY (N. Hamilton) *Liver Insufficiency in Malaria*.—Congrès International de l'Insuffisance hépatique Vichy 16-18 Septembre 1937 13 pp [25 refs.]

This is a comprehensive description of the structural and functional changes in the liver that are attributable to malarial infections. The subject is considered under three heads: pathology, clinical aspects and liver function tests. Enlargement of the liver is commonly found in malaria, sometimes with a distended and tender gall bladder. Post-mortem the swollen liver shows congested venules containing parasitized red cells; the Küpfer cells contain clumps of brown malaria pigment and the polygonal cells haemosiderin. Cloudy swelling of the parenchyma cells and even necrosis are sometimes seen. Jaundice which is not infrequent may be of haemolytic or toxic origin. Haemolysis is mainly intracellular; the haemoglobin is broken down into haemosiderin which is deposited in the cells of the liver, spleen and kidneys and haemobilirubin which circulates in the blood and causes haemolytic jaundice. The excess of haemobilirubin is converted into cholebilirubin. The resulting pleocholia causes bilious vomiting, bilious stools and urobilinuria. Intravascular haemolysis occurs in blackwater fever; the circulating haemoglobin is partly excreted in the urine and partly converted into pseudo-methaemoglobin.

The clinical types of malarial involvement of the liver are:—enlarged liver with gastric symptoms and sometimes decreased acid secretion; bilious remittent fever associated with either haemolytic or toxic jaundice; in the latter bile salts and pigment appear in the urine, the plasma gives a direct biphasic or delayed van den Bergh reaction and the bromsulphaline dye test may be positive; pigment gall stones; and malarial cirrhosis of the liver which the author describes as a clinical not a pathological entity.

N II

## HELMINTHIASIS.

BOGLIOLO (Luigi) Sopra i rapporti tra elminti e blastomi. [Helminths and their Connexion with Neoplasms.]—*Riv di Parassit* Rome. 1937 Oct Vol 1 Suppl. Monogr. No. 2. 60 pp. [209 refs.]

A study of the literature leads to certain conclusions on the connexion between worms and malignant disease.

*Cysticercus fasciolaris* adult *Gongylonema neoplasticum* and the eggs of *Schistosoma haematobium* are cancer producing probably by irritation. The first two are associated in natural conditions, with cancer in animals, and in experimental infections are found with cancer cells the last unusually often with cancer of the bladder. It is not certain that *O. felinus*, *C. sinensis*, *S. mansoni*, *S. japonicum*, *Gongylonema formosana* and *T. echinococcus* are so associated, and there is much doubt regarding *Rhabditis pallio*, *Hepaticola gastrica*, *Muspicum borrelis*, *Trichosomoides crassicauda*, "Strongilids," especially *Muellarius capillaris* and *Trichinella spiralis*. Clayton Lane

SUDAN. REPORT OF THE SUDAN MEDICAL SERVICE FOR THE YEAR 1936 [Schistosomiasis pp 22-25]

A record of the fine advance which has been made in the last ten years in the control of schistosomiasis in the Sudan.

In the Dongola and Merowe Districts of the Northern Province the fall in percentage of infection by *S. haematobium* has been from 16 to 3.4 in the Wadi Halfa District, surveys have only recently begun, the percentage of this infection was 19.46 in 1934 and 12.9 in 1936 in the Damer District a small focus of infection with *S. mansoni* was discovered in 1935 and after vigorous steps, no fresh infections have been found. In the Blue Nile Province in which during the last eight years annual examinations have increased in number from 2,341 to 23,067 the infection rate in the first four years averaged 0.885 in the last four 0.115. The remarks by Dr Goss Senior Medical Inspector of this Province, are —

Our chief means of security against bilharzia are sanitary measures combined with treatment.

Preventative methods are of prime importance and comprise protection of canals against fouling and the supply of good drinking water from wells.

To prevent fouling three measures are taken placing of villages not less than 300 metres from canals, fencing of canals and the provision of latrines.

The provision of deep wells is a certain remedy against bilharziasis, provided they are used, but the presence of a perennial supply of canal water all over the Gezira is too great a temptation to the average native and he will usually take water from a canal even if his village has a well. The majority of old wells in this area have fallen into disuse. Steps are being taken to open up old wells and to sink new ones. Five new wells have been sunk in the new Fawar area but, and before further expense is incurred, it must be seen whether they are being used. Issuing of regulations is an easy matter but their observance relies entirely on the common sense and good will of the native.

The co-operation of the native still lags very much behind the efforts of the Government and without a small army of officials we cannot be sure that sanitary regulations are observed over such a widespread area as the Gezira.

The yearly influx of labour from the western Sudan and outside is a real danger. Large numbers of these people are infected with bilharzia. They have no idea of sanitation and are a wandering population under very little control. Formerly an attempt was made to examine them at various quarantine stations outside the Gezira but this examination was easily evaded.

The key to the solution is to have them examined and treated before they enter the Gezira, but the difficulties of carrying this out are great as very few will present themselves voluntarily. C L.

CICCHITTO (Elio) La bilharziosi in Libia [Bilharziasis in Lybia].—*Arch Ital Sci Med Colon e Parassit* 1937 Aug Vol. 18. No 8. pp 494-509 [29 refs]

A survey in Italian of literature which has been reviewed in this *Bulletin* C L

GALLIARD (Henri) DANG-VAN NGU & PHAN HUY-QUAT Recherches sur le parasitisme intestinal à Hanoï. [Intestinal Parasites of Hanoï].—*Bull Soc Méd-Chirurg Indochine* 1937 June-July Vol. 15 No 6 pp 645-648.

Four methods of faecal examination were compared in 10 cases namely the smear a double gravity precipitation of the writers devising Telemann's and Garin's.

The authors' method is described as requiring no special material, no loss of time and a minimum of manipulation—two decantations after standing for 20 to 30 minutes suffice. It was tested on 10 cases against a smear of unstated size Telemann's method and Garin's method and came out best—how much best is not clear for text and table differ the number of infections detected by it being either 6 or 5 better than the smear 4 or 3 better than Telemann's and 4 or 3 better than Garin's. When 500 stools of patients were examined at random the percentage infections by smear and by this sedimentation method were respectively ascari 59.64 trichuris 50.55 ankylostomes 12.52 clonorchis 6.68 strongyloides 0.23 1.57

*Taenia solium* 0.08 enterobius 0.61 amoebic cysts 5.18 10.26 amoebic cysts with 4 nuclei 1.88 2.37 giardia cysts 0.40 0.8 The size of the smear or the amount of faeces used for the double sedimentation presumably after faecal disintegration are not mentioned

C L

MAKAR (N) Bilharziasis of the Gall-Bladder.—*Jl Egyptian Med Assoc* 1937 Nov Vol. 20 No 11 pp 512-524 With 8 figs.

This is believed to be the first case in which bilharzial cholecystitis has been reported in the living.

Ten years earlier the man had been treated with benefit by tartar emetic for bilharzial cystitis and dysentery. The present condition suggested cholecystitis but as he did not improve under ordinary antiparasitic treatment the gall bladder was removed and in its wall were found coupled worms with living and dead eggs and a histiocytic reaction. This was thickened with submucous infiltration fibrosis and calcification. C L

MAKAR (N) A Preliminary Note on Bilharzial Lesions of the Prostatic Urethra.—*Jl Egyptian Med Assoc* 1937 Nov Vol. 20 No. 11 pp 499-511 With 6 figs

Urethral examinations for haemospermia have allowed of the prostatic urethra being examined at a stage of bilharzial infection before it has become inaccessible to this form of examination.

The lesions fall into two stages congestive and atrophic. Two cases of each are described illustrated by reproductions of their appearances through the urethroscope  
C L

KOPPELSCH (Enrique) Studies on Schistosomiasis Mansonii in Puerto Rico. IV The Pathological Anatomy of Experimental Schistosomiasis Mansonii in the Rabbit and Albino Rat.—*Puerto Rico Jl of Public Health & Trop Med* 1937 Sept. Vol. 13 No. 1 pp. 1-54 With 54 figs. on 19 plates [18 refs.] [Spanish version pp. 55-114]

The pathological changes induced by this infection in these two animal species are closely described

Since the changes in rabbit differ from those in rat and in both are other than those seen in man and monkey they are not directly applicable to human pathology Koppelsch suggests that it must not be concluded that their differences from those in man are not in part due to results on the one hand of a single infection such as the animals had and on the other of the multiple infections which presumably are usual in man. In the two series of hosts the changes are followed organ by organ, and by the hour or day Larvae reach the great veins by the lymph stream, the lymph nodes rarely appearing to destroy them judging by sections they are very rarely found in blood vessels so it is concluded that they rarely travel by the blood stream There was no evidence that they travelled by boring through tissues Petechial haemorrhages might occur in lungs, thymus, stomach and liver and since serial sections might show no larvae near them it is questioned whether they are traumata caused by larvae Cells of the reticulo-endothelial system were conspicuous about the parasites of all ages and in all organs.  
C L

CHU (C F) Schistosomiasis Japonica in Kanking.—*Chinese Med Jl* 1937 Nov Vol 52 No 5 pp 651-684

The condition and treatment of 39 cases of Japanese schistosomiasis are detailed

Apart from ordinary conditions it is noted that the cause of about 20 per cent of cases of cirrhosis of the liver was schistosomiasis, and that this infection was the probable cause of much of the so-called idiopathic nodular cirrhosis of the liver

Moderate anemia was found in most of the chronic cases The high eosinophilia and leucocytosis are of considerable importance in the clinical diagnosis of the disease but they may not be found in certain cases. Positive globulin test was found in about two-thirds of the cases on which the test was done

"Eleven cases were treated by foudan with five failures It was found that very large doses of foudan had to be pushed in order to get the therapeutic effect Tartar emetic was used with good response in four

cases neostibosan appeared to be entirely useless. It appears that tartar emetic is the most effective and economical remedy that we have at our disposal at the present time

C. L.

BULLETIN MEDICAL DU KATANGA 1937 Mar Vol. 14 No 1 pp 46-48  
—Les réactions hépato-spléniques dues à *Schistosoma mansoni*  
'Reactions to *S. mansoni* in the Liver and Spleen.'

CAWSTON (F. G.) Recent Advances in the Cure of Bilharzia [Correspondence —*South African Med J* 1937 Oct 9 Vol. 11 No 19 p 703]

WEI (Kuang) Susceptibility of Various Mammals to Experimental Infection with *Fasciolopsis buskii* (Trematoda Fasciolidae)  
—*Ann Trop Med & Parasit* 1937 Oct. 22. Vol. 31 No 3 pp 361-372. With 2 plates. [17 refs.]

Twelve species of mammals represented by 6 pigs 4 dogs 1 buffalo 6 rabbits 1 monkey 4 cats 1 sheep 1 goat 1 ox, 5 guinea pigs 5 albino rats and 10 mice were fed with *F. buskii* cysts and autopsied at different intervals. Practically all helminths develop to maturity in pigs when these are lightly infected. As far as was ascertained the worms remain immature in dogs. In rabbits both immature and mature stages of *F. buskii* were met with, and there is a possibility that this host may prove a suitable experimental animal for *Fasciolopsis* work. Immature worms were noted in the young buffalo but there is not sufficient evidence to say whether they might develop further. The remaining animals (monkey cats, sheep goat, ox guinea pigs, rats and mice) appear at present resistant to *Fasciolopsis* infection.

C. L.

SHIMIZU (K.) & KAWADA (T.) Prevention of Distomatosis Hepatis as carried out in Okayama Prefecture.—*Jl Public Health Assoc Japan* 1937 Sept Vol. 13 No 9 pp 1-4

Measures taken for the prevention of infection by *Clonorchis sinensis* are given

They are firstly the keeping of ducks infected with *Notocotylus attenuatus* for these infect snails which are described as *Bulinus striatulus japonicus* Pilsbry and render them sterile so that they are no longer able to reproduce and so to spread clonorchis infection this measure has been going on for some years in the villages of Fukuda and Okiyo and whereas before a single dip of the net brought up two or three hundred of these snails it now brings up five or six only. Secondly fighting fish (Paradise fish) destroy these snails and have been bred and let loose where the snail is present. Thirdly there is spread of knowledge by lectures and the cinema. Faecal examinations have also been made before (on 2,508) and after (on 2,285) a treatment held appropriate for round worms and hookworms the infection figures obtained before and after such treatment were respectively for roundworms 263 and 251 hookworms 497 and 630 liver flukes 432 and 807 others 353 and 434. It is gathered from the abstract that they concern the same persons. [The general increase in apparent infection is striking.] The future policy is to follow these same lines. Further a leaflet is being distributed urging that for the good name of the Okayama prefecture river fish should not be eaten unless fully

cooked that no unboiled or unfiltered water should be used for drinking for washing food, or cooking or feeding utensils for washing the face, for gargling or for bathing

C. L.

EJSMONT (L.) *Opisthorchis tenuicollis* (= *O. felinus*) en Pologne. Cas observés chez l'homme [Infestation of Man by *Opisthorchis tenuicollis* in Poland].—*Ann Parasit Humains et Comparés* 1937 Nov 1 Vol 15 No 6 pp 507-517 With 2 figs. [40 refs.]

The author believes that the name *Opisthorchis felinus* (Rivolta, 1884) should lapse as a synonym of *Opisthorchis tenuicollis* (Rudolphi 1819). Two more cases are reported from man in Poland.

C. L.

CAWSTON (F. G.) Recent Advances in the Cure of Bilharzia. [Correspondence].—*South African Med J* 1937 Oct 9 Vol 11 No 19 p 703

TARASSOV (V.) De l'immunité envers le bothriocéphale *Diphyllobothrium latum* (L.) [Immunity to Re-infection by *Diphyllobothrium latum*].—*Ann Parasit Humains et Comparés* 1937 Nov 1 Vol 15 No 6. pp 524-528

It is believed that an infection with *D. latum* gives rise to an immunity lasting 2 or 3 years but not longer.

The village of Podnavolok in Karelia had 143 inhabitants. All submitted to examination and 125 (86.7 per cent) were infected with *D. latum*, most of the uninfected being young children. Of the infected 60 were unwormed. Three years later 20 were again found infected, 40 were not; an immunity seemed to be in existence. Tarassov then infected himself by swallowing a series of plerocercoids, all from the pike. On 7th May 1932, he swallowed 7 plerocercoids, on 21st May 1932, oncospheres appeared, on 12th June he expelled 38 metres of strobile with 7 heads, while still harbouring them he had much abdominal pain, lost 8 kgm. and weakness forced him into a sanatorium. On 22nd August 1933 he swallowed 6 more plerocercoids, on 7th September 1933 oncospheres appeared, on 29th September he expelled 6.3 metres of worm and two heads. On 13th August, 1934 he swallowed 7 plerocercoids without infection. On 17th August 1935 he swallowed 6 more with no infection. On 25th July 1936 he swallowed 6 more, eggs appeared on 12th August and 4 heads with 26 metres of strobile were brought away on 12th September. After these various expulsions passage of oncospheres or segments ceased in all instances.

C. L.

NARIHARA (NORIO) A Case of Human Infestation with Rat Tapeworm (*Hymenolepis diminuta* Rudolphi) in Formosa.—*Taiwan Igakkyo Zasshi* (Jl Med Assoc. Formosa) 1937 Oct. Vol. 36 No. 10 (391) [In Japanese pp. 2285-2299 With 2 figs. [34 refs.] English summary p. 2290.]

The author found the eggs of this worm in the faeces of a girl of 8 years of age in Taiboku City and as a result of a vermifuge the worm was passed.

and measured 25 cm in length with approximately 1066 segments without scolex  
C L.

ROMAN (E) Hôtes intermédiaires nouveaux d'*Hymenolepis diminuta* (cestodes hymenolépидidés) [New Intermediate Hosts of *H. diminuta*].—C R. Soc Biol 1937 Vol. 126 No 24 pp 26-28

To the intermediate hosts of *H. diminuta* are added *Aphodius distinctus* and *Anobium (Stegobium) paniceum*. They are not thought to be important.  
C L.

GODFREY (M F) Hydatid Disease Clinical, Laboratory and Roentgenographic Observations.—Arch Intern Med 1937 Nov Vol 60 No 5 pp 783-804 With 8 figs. [34 refs.]

This general survey covers the history of the infection from the time of its acknowledged presence in Jewish sacrificial animals its distribution on the globe its life cycle its incidence in various organs its diagnosis including the various laboratory tests and the X ray appearances in various organs the last taking up with its illustrations the greater part of the paper and including the differential diagnosis of what is there seen.  
C L.

WINFIELD (Gerald F) & YAO (T N) Studies on the Control of Fecal borne Diseases in North China. IV Vegetables as a Factor in the Spread of *Ascaris lumbricoides*.—Chinese Med J 1937 June Vol. 51 No 6 pp 919-926

Until other sources of infection have been excluded by adequate epidemiological studies it does not seem to us to be admissible to consider that contaminated vegetables are the major source of infection for *Ascaris lumbricoides*. Our data seem to make it clear that in North China this source of infection is negligible.

This paper continues studies already reported [this Bulletin 1937 Vol. 34 p 870]. It begins by a survey of the literature on vegetable borne ascaris infection [this Bulletin 1934 Vol. 31 p 611 1936 Vol. 33 p 949] and passes on to report on results of examinations of salted and of fresh vegetables nearly all from the Tsunan market and of the soil on which they were grown. There was for vegetables an examination either of the centrifugal precipitate of the water in which they had been washed or by centrifuging in a high specific gravity solution of salt sugar or sodium dichromate. [A saturated solution of common salt with s.g. 1200 is not dependable as a floater of ascaris eggs this must be as high as 1300 (LANE this Bulletin 1926 Vol. 23 p 261)]. The total washings from 274.5 kg. of vegetables did not reveal a single parasite egg nor were any found on celery leeks cabbage and beans from a vegetable garden in Lungshan though 3 ascaris eggs were found in one of 5 samples of its soil. In the sediment of containers in which salt vegetables had been kept no ascaris eggs were found though there were present those of plant parasites. Of 49 samples of soil from vegetable gardens 57.1 per cent showed ascaris eggs. As an explanation of their general absence from vegetables in this area it is suggested that the human faeces are used dried and are dug well into the soil, and if they are splashed up on to vegetables they are easily washed off by rain and if not their development may be stopped by their drying.  
C L.



NOLASCO (J. O.) & GACORA (C.) Helminthiasis in Children of Pre-School Age in the Non-Leper District of Cullon.—*Monthly Bull. Bureau of Health* Manila. 1937 July Vol. 17 No. 7 pp. 253-264 [11 refs.]

"A quantitative survey of stools of 230 children of pre-school age was carried out in two areas in the non-leper district of Cullon—150 from Culañgo and Jardin and 80 from Balala.

"The results for ascaris were as follows—for Culañgo and Jardin 67.3 per cent incidence with an average count of 15-410 eggs per gram of feces, and for Balala 37.5 per cent incidence with an average egg count of 5,870 or an estimated average worm load of about 16 worms for Culañgo and Jardin and 6 worms for Balala.

"The results for trichurus were as follows—for Culañgo and Jardin 55.3 per cent incidence with an average of 450 eggs per gram of feces and for Balala 25 per cent incidence with an average of 270 eggs.

In both localities the ascaris and trichuris infestations have been found to show a tendency to concentrate in a small number of individuals.

Seven children in Culañgo and Jardin and one child in Balala all below the age of two years were found infested with ascaris and one child in Culañgo and Jardin and one in Balala, also all below the age of two, were found infested with trichurus. In these very young cases, it is assumed that the infestations were probably acquired from the floors of their houses polluted by the promiscuous defecation of their elder brothers.

The method of diagnosis was that of Stoll.

C. L.

SARGENT (Willard S.) Acute Intestinal Obstruction due to Round-worms.—*U.S. Nat. Med. Bull.* 1937 Oct. Vol. 35 No. 4 pp. 482-484.

The boy recovered without operation.

A collapsed boy of 10 had a mass about the right iliac fossa, doughy and feeling much like worms. The abdomen was distended. An enema brought away faeces with ascaris ova and an improvement in his general state. As the lump persisted the enema was repeated. It left him with the mass but with no pain. By morning there was no lump and oil of chenopodium and then santonin brought away 87 worms. He left hospital well four days later.

C. L.

SORONDO CAMPANERÍA (Emilio) Contribución al estudio de la terapéutica del parasitismo intestinal. El chenopodium antelminticum y sus intoxicaciones. (On the Treatment of Intestinal Parasitism. *Chenopodium antelminticum* as a Poison.)—*Medicina de Hoy* Habana. 1937 June Vol. 2 No. 6 pp. 357-368. French summary.

Oil of chenopodium is held to be the anthelmintic of election for ascaris and hookworm.

The author holds that a single treatment will get rid of 60 to 70 per cent. of necators, 80 to 99 per cent. of ascaris and large numbers of trichurus, enterobius and *Hyrialepis nana*. Toxic symptoms the author has found to include burning sensation, nausea, deafness, profound coma. He had two deaths, one after advised doses, and one to whom the child's mother gave it seems, generous spoonfuls.

C. L.

BROWN (Harold W) Observations on the Mode of Action of Several Anthelmintics upon *Ascaris lumbricoides* (Plg Strain) —*Amer Jl Hyg* 1937 July Vol 26 No 1 pp 72-83

It has been shown that ascaris will ingest various solutions such as normal saline and mineral oil. They will also ingest solutions of certain anthelmintics such as carbon tetrachloride in mineral oil. On the other hand they refuse to ingest mineral oil solutions of chenopodium even in very great dilution

It has also been shown that the anthelmintics here studied act more rapidly when ascaris is immersed in solutions or suspensions of them than when such solutions are injected orally into the gastro-intestinal tract of the parasite. From these experiments it would seem that the mode of action of these anthelmintics on ascaris is through the body wall rather than after ingestion by the parasite

These experiments have also shown that a delayed death results when a small portion of a worm is injured by an anthelmintic applied locally.

C L.

SCOTT (J Allen) The Prevalence and Distribution of Hookworm Infection in Egypt.—*Amer Jl Hyg* 1937 Nov Vol. 26 No 3 pp 455-505 With 8 maps & 3 graphs. [18 refs]

Of the 12 million rural people in Egypt about 5 million have hook worm infection. Over most of the country the rate of infection is about 50 per cent at the north of the Delta the figure is less than 20 in the Fayum Province about 15 and it reaches 90 in some villages.

The data used are of two kinds. First those collected by the Endemic Diseases Section of the Public Health Department as the result of examinations of stools passed by about 2 million patients on arrival at hospitals. second those made under Allen Scott's supervision from stools passed by people in their homes about 40 000 in all. The hospital figures had been got by a floatation technique those at the houses by a Stoll-Hausheer count of 1 slide (0.005 cc). In order to check the relative values of the two series 253 specimens which had been examined at a hospital were re-examined the hospital floatation method gave a discovered percentage of infection of 30 a single egg count slide one of 35 three egg count slides one of 43. The floatation method had missed 38 specimens found positive by the Stoll-Hausheer slides and these missed 5 which the floatation method had found but when the Willis method and the Stoll method were both used on the same series of stools the former always yielded more positives. The percentage of positive cases varied from 0 in 500 examined at Minshat Rabia in the Fayum Province to 89 in 101 examined at El Qawadda in the Sharkiya Province. The two series differed not only in the diagnostic techniques used the hospital group had few children and was to some extent selected for illness while the other gave the exact locality of those examined. The house to-house visits bring out high rates of infection of 70 and 89 in Delta villages standing on sandy soil on the desert's edge. The two sets of findings are carried on along the Nile from Cairo to Aswan in two maps whose legends have evidently been transposed. In Fayum Province are two villages within 2 miles of one another the infection rate to the single Stoll Hausheer slide being 2 in one and 50 in the other and the cause of the difference could not be determined. The conjectured total of 5 million infected takes into account the conviction that the available methods of examination miss many cases. Again attempts to

convert egg-count figures into estimates of worm burdens involve such large errors" that Scott does not make them. He points out as the essential conclusion of his discussion that on the average there go together a high percentage of infected persons and a large number of worms in each infected person, and that the "constant relation between prevalence and intensity throughout the country has important implications in any study of the epidemiology of hookworm disease.

C. L.

SCOTT (J. Allen) Observations on the Transmission of Hookworm Infection in Egypt.—*Amer Jl Hyg* 1937 Nov Vol. 26, No 3. pp 506-526 With 16 figs on 7 plates & 1 map. [11 refs.]

Soil pollution is very common throughout and immediately surrounding Egyptian villages. Out of hundreds of specimens of soils from these localities however no hookworm larvae have been isolated. This failure of development is explained by the excessive dryness of the soils under these conditions, the hard packed nature of the surface and the fact that most village soils inhibit the development of larvae even in cultures where physical factors are held near their optimum values. This inhibition is tentatively attributed to the presence of excess chlorides or an associated factor. Field soils almost invariably are good culture media when moisture and physical conditions are held near the optimum. In spite of this, few larvae have been recovered from hundreds of isolations from such fields where pollution seemed to be occurring regularly. Several factors may have been the cause of this failure to find larvae here. Such fine clay soils commonly do not serve as good media for developing hookworm larvae under normal environmental conditions. Even with irrigation the moisture content frequently falls fairly low on the surface and under such conditions the hot sun may kill many larvae. Furthermore, the inhibiting condition was shown to be present to some extent in the marginal portions of fields i.e. the parts where defecation is most common. Most important of all perhaps is the fact that defecation is always scattered in the fields and the chances of contacts with places where many infective larvae develop are extremely slight. Occasionally concentration of stools occurs just above the water line of canals, ponds or river and from such places large numbers of larvae have been isolated. As a rule however even here pollution is not concentrated, and these places probably only occasionally and in particular localities act as important sources of infection. It is probable then, that little infection is acquired either in or adjacent to the villages. In the fields and near the water level of canals, ponds and river soil infestation is widespread but seldom intense. These observations harmonize with the facts of distribution of the parasite i.e. the widespread but low grade human infection probably results from the fact that a dispersed type of field pollution produces widespread and low grade soil infestation, and from the fact that concentrated soil pollution occurs only where the conditions are unfavorable for larval development. In contrast to these relationships are the heavy hookworm burdens of people in other countries where concentrated pollution in places suitable for hookworm development leads to spots of intense soil infestation."

C. L.

KELLER (A. E.) LEATHERS (W. S.) & KNOTT (J. C.) The Present Status of Hookworm Infestation in North Carolina.—*Amer Jl Hyg* 1937 Nov Vol 26 No 3 pp 437-454 With 3 maps. [11 refs.]

As the result of the examination by the Stoll Hausbeier method of 0.005 gm of faeces from each of 37,391 white persons and of 6,301

negroes the percentage of detected infection was 12.3 for the first group and 4.0 for the second.

This is a continuation of the investigation by the same technique already put through in North Carolina South Carolina Mississippi Kentucky and Tennessee and these new and strictly comparable findings made by this technique are compared with the old ones got by the Rockefeller Sanitary Commission in 1910-1914 with the conclusion that since that date there has been in these States a percentage reduction in the incidence of hookworm infection of 66.4 33.7 62.5 77.3 and 72.8 respectively. The incidence so detected varied from 0.9 per cent in Durham County which is on clay to 52.9 in Onslow County which is on sand or sandy loam and it is noteworthy that in the latter county the percentage found in negroes was 16.0 which again was the highest for the race in the State. The incidence was low in those under five years old and reached its peak in persons 15 to 19 years of age. Sex had no appreciable effect but that of the family as shown by the number of infected in it and their weight of infection was evident. The average weight of infection was indicated by 3100 eggs per cc. of faeces in white persons and 1600 in negroes. For the entire series of examinations 20.8 per cent of all the positive examinations contained 2600 or more eggs per cc. of faeces which is the intensity level at which clinical symptoms are likely to occur.

[The percentage of reduction quoted depends on the assumption that the size and optical density of the faecal smears actually examined by the Rockefeller Commission were the same as those of the Stoll-Hausheer technique. The present extent of infection as shown by this technique which examines 0.005 gm. of faeces can hardly be the real figure if Stoll was right in calculating that a single female *Necator* lays eggs at the rate of one to every 0.05 gm. of mushy faeces and of two in that quantity of solid faeces.] C. L.

PESSÔA (S. B.) & PASCALE (Humberto) Pesquisas sobre a ancilostomose em São Paulo. I. Sobre o methodo de Stoll Hausheer para a contagem de ovos nas fezes. [Investigations on *Ankylostomiasis* in São Paulo. I. On the Stoll-Hausheer Method for counting Eggs in Faeces.]—Reprinted from *Rev. Biol. e Hyg.* 1937 Aug. Vol. 8 No. 1 pp. 27-36 [11 refs.]

The authors examined 31 cases by this method and found no relation between egg counts and worms recovered by treatment and point out that as a method of diagnosis of infection this method cannot detect those which are light.

The faeces arrived at the laboratory on ice within 12 hours of being passed and were in a perfect state of preservation. Infected persons were treated with carbon tetrachloride tetrachlorethylene or oil of chenopodium and the worms passed were collected and counted. All but about 1.3 per cent. were *Necators* so that the question of any different worm-egg ratio between *A. duodenale* and *N. americanus* could in practice be disregarded. After two treatments evidence of unworming was got by Willis' method. A table shows that the number of eggs in a gram of faeces average 36.5 for each female recovered, with however variations from 3 to 300. The weight of infection as influencing the fecundity of female worms is shown in two tables when the number of female worms recovered was from 1 to 26 the number of eggs in 1 g. of faeces per female worm averaged 85.9 (33

to 300) when it was between 33 and 242 the eggs per gram per female worm averaged 28.9 (6 to 82) in nine cases negative to the Stoll-Hansaer technique and treated the mean number of females expelled was 3.7 (1 to 11). Again there were treated 11 cases negative to the simple smear and 9 negative to the Stoll-Hansaer method of the former 7 expelled worms of the latter 8 the total numbers expelled being respectively 30 and 47. The authors give full credit to those who have already reported similar findings. *C. L.*

**PISSÓIA (Samuel B.) & PASCALE (Humberto)** Pesquisas sobre a ancylostomose em São Paulo VI. Intensidade da ancylostomose nos escolares de varios municipios. [Incidence of Ankylostomiasis among School-Children in São Paulo.]—*Falks Med* 1937 Dec. 15. Vol. 18 No 35 pp 589-591

The authors examined by Stoll's method the faeces of school-children of five municipalities in São Paulo. The total examined was small 1 177 of these 888 or 75.4 per cent. were passing *Necator ova*. Boys numbered 617 girls 560 and the relative percentages positive were 77.7 and 73.5. The lowest infestation was in Santo Amaro but even there among 363 there were 52.4 per cent. positive. In the coastal districts it was higher in São Sebastião 98.8 per cent. of 172 and in Villa Bella 97.2 per cent. of 109. Among those living in houses furnished with latrines the percentage was 70.1 and among those without them 85.2. Of the latter as many as 88 per cent. of those under 9 years of age were infected. *H. H. S.*

**CROCCITTO (Angelo M.) & CROCCITTO (Elio)** L'anchilostomiasi nei paesi caldi. [Ankylostomiasis in Warm Climates.]—*Polis medico Soc. Prat.* 1937 Oct 11 Vol 44 No 41 pp 1836-8 1941-2, 1945-9 With 4 figs. [25 refs.]

**MARTILLOTTI (F.)** Su alcuni casi di anchilostomiasi nell'infanzia. (Considerazioni epidemiologiche e cliniche.) [Some Cases of Ankylostomiasis in Childhood. (Epidemiological and Clinical Considerations.)]—*Pediatrics*. 1937 Sept 1 Vol. 45 No 9 pp 820-832 [24 refs.]

Four cases of hookworm infection in children are described having the usual characters. It appears that in 1934 1935 and 1936 the numbers of infected persons detected in the Province of Naples were 33 22 and 34. The diagnostic method is unmentioned and if it was the smear it is probable that adequate systematic examinations would display a considerable infection. The nomenclature used does not conform to the International Code. *C. L.*

**CIMINO (Vincenzo)** Il segno della lingua negli anchilostomiasici indigeni. [The Tongue Sign in Indigenous Ankylostomiasis.]—*Arch. Ital. Sci. Med. Colon e Perussit* 1937 Apr Vol. 18. No 4 pp 196-199 With 1 coloured plate

It is claimed that in Somaliland there has been found a new sign diagnostic of ankylostomiasis and consisting of a punctiform pigmentation of the tip and sides of the tongue the colour being dark

bluish like that of Addison's disease pernicious anaemia and arsenical poisoning. It is stated that examination of the faeces by an unstained method was accurate and that judged by it infected persons had pigmented tongues and non infected had not. (Many will doubtless reserve opinion on the rehabilitation of this discredited sign until the means have been detailed which were used to distinguish infected from uninfected in an area described by Cimuno as heavily infected especially when they bear in mind what Asuford and King wrote just over 30 years ago (*J Amer Med Assoc* 1907 Vol 49 p 471). Some writers have called attention to purplish spots on the tongue and have attached considerable importance to them as being distinctive of the disease. We have noted two kinds of discolouration a rather diffuse smear generally on each side of the dorsum of the tongue which apparently is due to venous engorgement and was not present in the majority of cases and rather more frequently pigmented spots 2 mm to 4 mm ( $\frac{1}{4}$  to  $\frac{1}{2}$  inch) in diameter which were seen both on the tongue and the buccal mucous membrane. They were frequently noticed in persons of mixed race and could probably be found in other diseases.

BOYNE (C) Invasion of the Submucosa of the Human Small Intestine by *Ancylostoma brasiliense*—*Amer J Trop Med* 1937 July Vol. 17 No 4 pp 537-594 With 8 figs.

The report includes details of three instances already reported [this *Bulletin* 1938 Vol. 33 p 113] and of two more which are new. In one of the first cases the appearance of the cleaned and cleared mouth capsule showed the worm to be *A. brasiliense*. In all five there were intestinal lesions with the same gross anatomy and histological picture.

The worms were found only incidentally in systematic histological studies of circumscribed haemorrhages in the jejunal submucosa the largest being a few centimetres in diameter. The findings were these (1) Eggs and larvae in the submucosa where there was haemorrhage with marked leucocytic infiltration mainly by eosinophils destruction of tissue an intact mucosa with no eggs or larvae on it the patient being a Malay woman of 30 with purulent nephritis and cystitis ulceration of the rectum and tuberculosis of the lung (2) An immature worm 0.3 mm in diameter whose sex was not determined apparently because many of the worm sections had fallen out. It had a buccal capsule armed with large teeth. The patient a Malay of 40 dying of peritonitis from a perforation proximal to a constriction 60 cm. from the pylorus the walls of the hole showing plasma cells eosinophils and oedema. (3) An adult worm with a maximum diameter of 0.6 mm and many eggs and larvae in the submucosa in a Malay man who died of amoebiasis (4) An adult worm with eggs and larvae in the submucosa of a Malay man with a maximum operation for vesical calculus and having cystitis pyelonephritis and prostatic abscess. (5) Three worms two being immature females the third the same or a male. Much tissue damage involving destruction at certain points of the circular coat and leucocyte infiltration of subserosa and submucosa. It is pointed out that presumably there was here straying of a parasite in a non-optimum host.

Ryo (Sal) Investigations on Anemia caused by *Ancylostomiasis*.  
 I. On the Blood Changes by Experimental Infection of *A. duodenale*  
 II. The Comparison of the Blood Changes before and after the Treatment. III. On the Egg Production of *A. duodenale* and *A. americanus*. IV. On the Blood Sucking Activities of *A. caninum*.  
 —*Jl Oriental Med* 1937 Sept Vol. 27 No. 3. [In Japanese pp 269-278 [18 refs.] 279-286 287-294 [22 refs.] 295-302. English summaries pp 24 25 26 27]

I "The blood changes of three Manchurian volunteers experimentally infected with *A. duodenale* were carefully studied during 19 weeks after the infection. The conclusions are as follows

1 A droplet containing 300 larvae was laid on the skin of the upper extremity. The larvae which trespassed through the skin were 285, 292 and 291 respectively and the adult worms grown from them numbered 83, 78 and 77. The duration from the infection to the oviposition lasted 54, 55 and 57 days respectively.

2 Eosinophilia was not recognized on the third day of infection but became obvious after one week and reached the highest point in the 6th-7th week though the count decreased gradually after the 15th week. The erythrocyte count showed a moderate change after the 6th to 11th week of the infection and the amount of hemoglobin reduced very slightly after 5th to 6th week without indicating any change in the index. The reticulocyte increased in number after the third week of the infection.

3 The eosinophilia caused by *ancylostomiasis* seems to be due to the metabolic products of the worms themselves not to substances set free from the dead larvae and the anemia seems to be very reasonably explained by the continuous bleeding.

II Blood pictures were studied in 20 cases of single and mixed infection of *A. duodenale* and *A. americanus*. The conclusions reached are as follows

1 The numerical relationship between the number of worms and the intensity of the anemia is not recognizable when worms harboured are less than 50.

2 The anemia brought about by the infestation of fewer than 50 worms is moderate or very slight.

3 The colour index does not alter; the reticulocyte is always visible and becomes more numerous when the anemia is intense. The maximal resistance of the erythrocytes to the salt solution tends to increase.

4 The sedimentation rate of the erythrocytes usually accelerates.

5 The function of bone marrow appears to accelerate and no paralytic phenomena at all were seen.

6 The recovery of the blood from these changes is not complete until the 6th week of the treatment and recovery is remarkable if the anemia is severe.

7 Anemia caused by *ancylostomiasis* is not similar to myelopathy but it resembles the anemia caused by continuous bleeding.

III The egg counting method has become useful in practice since Stoll's method was first published. The principle of this method is to calculate by direct means the eggs contained in a known quantity of feces. Wakashima proposed a new method in 1932, in which the eggs are to be calculated indirectly by the numerical comparison with the eggs and the particles of lycopodium. As the author believes that this method is very simple and accurate so he utilized it in the present study. The conclusions reached are as follows

1 Wakashima's method is very useful in the practice of the egg counting of the helminths.

2 *A. duodenale* lays about 10000-20000 eggs and *A. americanus* about 5000 eggs per day.

11 The blood sucking activities of *A. caninum* were measured by Wells originally in 1931 and the same sort of experiment was done by Nishi in 1933. They ascertained the possibility that a single worm sucks almost 1 cc of blood per day. The author believes that this datum is a very important point in the argument regarding the truth of ancylostomiasis anemia.

The following are the results obtained by the author who experimented in the same manner as Wells and Nishi did.

- 1 The blood sucking activity was enormously affected by temperature. A temperature from 38 C to 39 C is most favourable and the female absorbs more blood than the male.
- 2 Every worm ejects the blood rhythmically from the anus and blood amount expelled at one time is calculated at 0.149 cc per day. The blood which issues from the place of attachment is about 0.235 cc per day. Therefore the blood loss caused by harbouring per worm is about 0.38 cc per day. This figure should be multiplied 4 or 5 times when the worms are very vigorous.
- 3 The blood loss caused by the attachment of the worms is not negligible in the etiology of ancylostomiasis anemia.

C L

LILDSBERG (J W) The Reticuloocyte Response In Acute Fatal Hookworm Anemia.—*Amer J Hyg* 1937 July Vol. 26 No 1 pp 60-71 With 2 graphs [19 refs]

The anaemia was acute and posthaemorrhagic in character and was accompanied by a marked reticulocytosis which renders unlikely the theory of a myelotoxin inhibiting the activity of the bone marrow at least in acute hookworm disease.

These experiments on dogs infected deliberately with *Ancylostoma caninum* fall into two series. In the first there was caused a fatal illness by the giving by mouth in a single dose to seven dogs of 1060 to 10680 larvae or 147 to 1187 per kilo of body weight. The clinical and post mortem findings were the same in all—progressive weakness, the passage of stools consisting essentially of blood and mucus, the refusal to feed and after death pale mucous membranes (presumably haemorrhagic areas and filled with blood and mucus, the present in visible parts during life the small intestine showing large haemorrhagic areas and filled with blood and mucus). During life there was no evidence of haemolysis (that is no colouring of the serum) there was nucleation of erythrocytes (polychromatophilia and anisocytosis). Reticulocytes increased with wavelike fluctuations as the red cells and haemoglobin lessened and it is noteworthy that the reticulocyte response and the length of life of the dog were greater in adults than in pups. In three controls (litter mate dogs bled to death by five to nine bleedings amounting in all to from about a tenth to about a fifth of the body weight) there was the same reticulocytosis amounting at death to figures varying from 18 to 50 per cent. In the second series a fatal hookworm infection was brought about after there had been in each of the two dogs an earlier reticulocytosis induced by a non fatal infection and in the other by periodic bleedings the blood picture having been allowed to return to normal before the fatal infection was induced. In both dogs a second marked reticulocytosis preceded death and it is concluded that inhibition of marrow activity could not have been the cause of the anaemia.



seeing that there was not only a reticulocytosis equally in all infected and all bled animals, but also a second reticulocytosis in the dog which had a second infection. [As to progressive anaemia after infection the report on D938, Table I is that in 8 days after infection the haemoglobin value had risen from an average of 8.2 gm. per 100 cc. before infection to a figure of 12.4 on that day. Regarding the inference that hookworm anaemia is not due to a lessened activity of bone marrow resulting from a poison excreted by the worms there is no doubt in preparation a report on the actual observed state of the bone marrow of these important sacrificial animals at the time they died.]

C. L.

SILVEIRA (Tacito) & DE MOURA CAMPOS (F. A.) *Das trocas gasosas na ancylostomose* [The Interchange of Gases in Ankylostomiasis.] — *Hospital* Rio de Janeiro 1937 Aug. Vol. 12. No. 2 pp. 165-187 With 3 figs. [45 refs.] English summary

The following is the substance of the author's summary —

In this paper several problems connected with hookworm anaemia were considered. Basal metabolism was measured and also  $O_2$  capacity, cell count, colour index and  $CO_2$  of the blood were determined. Haemoglobin was estimated by  $O_2$  capacity figures. pH was calculated theoretically according to Hasselbach's formula. The following conclusions were drawn —

- 1 Basal metabolism range was from -9.1 to +13 per cent of the predicted standards for people living in tropical countries.
- 2 Oxygen capacity of the blood ranged between 6.07 to 18.67 vol. per cent.
- 3 Haemoglobin estimated according to  $O_2$  capacity figures varied between from 4.53 to 13.89 gm. per cent. These data correspond to 32.5 and 100 per cent of the predicted standards. Corrections by Williamson-Harden and Appleton's table reduced these figures to 31.9 and 90 per cent.
- 4 Colour index calculated according to van Slyke's method oscillated from 0.28 to 1.22. In two instances it was higher than 1.0. Both referred to patients with very intense anaemia.
- 5 Total  $CO_2$  of the blood range was observed from 38.36 to 59.16 vol. per cent.
- 6  $CO_2$  in solution ranged between 2.24 to 2.27 vol. per cent.
- 7 Combined  $CO_2$  ranged between 36.11 to 57.90 vol. per cent.
- 8 pH varied between 7.30 to 7.51.

C. L.

COCKELL (W. C.) *Soil Sanitation*. — *Jl Roy San Inst* 1937 Nov Vol. 58 No. 5 pp. 325-334 With 4 figs. [Summary appears also in *Bulletin of Hygiene*.]

The author of this paper is the Senior Sanitary Inspector of the Central Board of Health Fiji and he describes how the prevention of hookworm by means of the installation of sanitary latrines and prevention of soil pollution has been effected in Fiji.

The introduction of Indian labour into Fiji some 60 years ago was followed by a high mortality from hookworm, and in 1917 in co-operation with the Rockefeller Foundation a campaign against hookworm the frequency of which in some districts was as high as 96 per cent. of

the persons examined was conducted. Another campaign was under taken in 1922 and hookworm ceased to be a serious problem in 1927. Illustrations are given of a standard type of latrine which consists of an octagonal slab of concrete reinforced with  $\frac{1}{4}$  inch mild steel bars and provided with a central opening 6 ins  $\times$  14 ins and a wooden block to fit the opening. Footrests raised  $\frac{1}{2}$  inch above the surface of the slab are also provided for squatting purposes.

The borehole underneath the slab is sunk to a depth of 20 ft wherever possible but in some instances holes 12 ft deep have been found to last for a considerable period. The Central Board of Health has encouraged the construction of this standard type of latrine and has educated the native population on the advantages of its installation and maintenance by means of cinema films dealing with the dangers of hookworm infection and the fly danger.

Up to 1932 some 3,200 standard latrines had replaced the in sanitary holes and box seats within a 15 mile radius of Suva the capital of the Colony. At that date a further campaign was undertaken along with the Rockefeller Foundation with the object of providing borehole latrines in all Fijian villages as well as in Indian settlements and up to the end of 1936 over 18 000 cement slab latrines had been completed.

The Central Board of Health has drawn up a standard septic tank design which is to be regarded as the minimum requirement for this type of installation. The tank has a minimum capacity of 200 gallons when used for not more than 8 persons and an increased capacity of 10 gallons for each additional person. The use of filter beds is not recommended in Fiji. The effluent from the septic tanks is disposed of by means of rubble drains or open channels carried well away from dwellings.

H T Carter

PESSÔA (S B) & PASCALE (Humberto) Pesquisas sobre a ancylostomose em S Paulo II Tratamento da ancylostomose pelo tetrachloretyleno [Treatment of Ankylostomiasis by Tetrachlorethylene]—*Ann Paulist Med e Cirurg* 1937 Vol. 34 No 5 pp 429-432 435-439 [16 refs.]

A single dose of 4 cc of tetrachlorethylene in gelatine capsules gets rid of about 95 per cent of Necator. Before considering tetrachlorethylene and in connexion with SOPER's finding in Ecuador that deaths from carbon tetrachloride have been wrongly considered as due to yellow fever the writers draw attention to a paper by PESSÔA (*Rev Med de Pernambuco* 1936) describing a similar case in a child of 12 who had been given 1.5 cc of carbon tetrachloride. A discussion on the findings of other workers follows. The present report is on 51 persons in 5 groups who were treated first with tetrachlorethylene then after an interval with carbon tetrachloride in an adult dose of 4 cc. the worms passed being collected separately after each treatment. 15 days after the second treatment the faeces were examined by Willis technique and in these 51 cases no eggs were found. The whole number treated had been over 60. The value of the treatment is expressed, as it was by SCHÜFFNER and VERVOORT in 1913 as the percentage of all the worms collected which was found after the first treatment. The cases are described in 5 groups their numbers the dose of tetrachlorethylene

alone or combined and the percentage of the total bag got after the first treatment. They are Group I 21 treated with 3 cc. of tetrachlorethylene and 88.2 per cent. of the total bag got after the first treatment. Group II 8 treated with 4 cc. of tetrachlorethylene and 95.8 per cent. expelled by the first treatment. Group III 8 treated with tetrachlorethylene 2 cc. and 0.75 cc. of oil of chenopodium with 91.7 per cent. expelled. Group IV 9 children of average age about 10 years, given 1.5 cc. of tetrachlorethylene and 0.25 cc. of oil of chenopodium in castor oil and 17 per cent. of the recovered worms coming away with it yet in Group V were 5 children of average age about 9 years, who were given the same dose of tetrachlorethylene and oil of chenopodium but in water with a saline purge an hour later and the percentage of the worm recovery by this was 70.2. Some 50 to 60 per cent. of the treated had giddiness the drunken feeling coming on in more persons and with greater intensity than after the same doses of carbon tetrachloride. There have been given over 300 treatments with no accident except more or less pronounced giddiness. [The validity of the argument and conclusions rests on the assumption that Willis' technique will display all infections for the poorer the technique in accuracy the higher cure rate will it give. On this point see the results of MAPLESTONE and MUKERJI below.] C. L.

MAPLESTONE (P. A.) & MUKERJI (A. K.) Further Experience with Tetrachlorethylene.—*Indian Med Gaz.* 1937 Nov Vol 72. No. 11 pp. 650-652

The figures produced in this paper confirm the fact that our earlier result recording 62 per cent. of cures with tetrachlorethylene [this *Bulletin* 1934 Vol 31 p 393] is much nearer the truth than our first results which were only 20.7 per cent. [this *Bulletin* 1930 Vol 27 p 419] and an explanation of the apparent failure of the drug on this occasion is offered. Results of treatment of taenia and enterobius infections are also recorded.

The present work was on out-patients. Faecal examinations were by D.C.F. the writers continuing to be satisfied that the amount of egg reduction after treatment gives quite a wrong idea of a drug's efficacy and holding since one's aim should be unworming by one treatment that diagnosis should be by the most accurate method available. The interval between treatment and re-examination was not less than 10 days and as the result of these re-examinations the treated are put into 4 classes—(1) Real cures where D.C.F. showed no eggs. (2) Practical cures including real cures and what may perhaps be called "near cures" those specimens in which D.C.F. showed one or two eggs and which were not held worth while to treat again. (3) Those persons not seen again. (4) Those who were still infected on re-examination and were re-treated.

*Hookworm infection*.—These persons fall into two nearly equal series. In the first adult treatment was by 3 cc. of tetrachlorethylene and 1 cc. of oil of chenopodium with an ascaridole content of 65 per cent. it comprised 96 persons after the first treatment the numbers in the four categories were respectively 43 10 12 and 31 after re-treatment the thirty-one were classed as 14 6 4 and 7 and after the third and last treatment the seven were classed as 4 2 and 1 the percentage of known cures by one treatment was then 44.8 of known "practical cures" 55.2, and, if the 12 absentees fared in like manner the presumed

absolute cures were 65.6 and practical cures 84.4 after two treatments.

In the second series 90 persons were treated with an adult dose of 4 cc. of tetrachlorethylene and the numbers in the four categories were 50 11 9 and 20 those of the 20 re treated were 9 2 1 and 8 of the 8 treated a third and last time 6 1 and 1 the percentage of known cures by one treatment was then 55.5 of known 'practical cures' 67.7 after two treatments the figures were 70 and 85.5 and after 3 treatments 77.7 and 84.4.

*Taenia infection*—The treated numbered 13 all in patients 4 passed heads in their 48-hour post treatment stay in hospital 6 had had no recurrence 3 to 5 months later in 3 segments reappeared in 2 the heads were of *T. saginata* in 2 of *T. solium* both of these latter being however experimental infections and the only instances of this tapeworm seen.

*Trichuris infection*—The examinations regarding the effects of tetrachlorethylene were felt to be unsatisfactory but the impression was that the drug was of little value.

*Enterobius infection*—The cure rate based on washing the stools brought by patients is put as 90 per cent.

[On hookworm treatment the writers feel of the reviewer's comment on FAUST's paper (this *Bulletin* 1937 Vol 34 p 455) that it does not seem a fair statement of the case that when our work is cited as evidence of the value of tetrachlorethylene only the inferior figures are quoted. As an explanation of the finding of a lower anthelmintic value for tetrachlorethylene in gelatin capsules than out of them Maplestone and Mukerji note that 3 or 4 years after the experiment in which they gave the capsules they found an overlooked tin with the capsules in it collapsed and empty and they suggest that evaporation may have begun before the apparently full capsules had been used in their first test in other words that they were not giving the full doses they had a right to think they were. The higher figure which the writers feel should have been mentioned (this *Bulletin* 1934 Vol 31 p 393) referred to a mixture of tetrachlorethylene and oil of chenopodium. It could not rightly have been quoted in expressing disagreement with FAUST's statement that a cure rate of 90 per cent is to be expected from tetrachlorethylene alone. The figures got by Maplestone and Mukerji were the only ones of which I knew obtained by experienced and dependable workers who were using as they themselves feel the most dependable diagnostic method at present available. But in proportion as tetrachlorethylene is held safe does there remain a justification for leaving if it can possibly be avoided any infected person to be a spreader of infection on any scale?]

C. L.

decreased admissions and increased discharges chiefly of convalescent patients mainly of the neural type. The average age on admission was 36.5 years and the number of children under sixteen was under one-eighth of the total cases. The duration of the disease on admission according to the patient's statements was 1 to 12 months in 55 per cent, 13 to 24 months in 18.6 per cent and in 25.6 per cent it was over two years or much lower than in the Union of S. Africa. In addition there were 8 000 attendances at a daily dispensary. The intradermal treatment is popular 65.5 per cent of the patients accepting it. A Settlement Farm provided practically all the fresh vegetables and milk with great saving of expense.

ii. This is an instructive survey of the Quthing and Qacha's Nek districts from which the largest proportion of patients come and they showed a rate of 3.2 per mille. Fortunately 90.5 per cent were mild neural cases. A number of discharged patients were examined and the few recurrences found were of such a mild type as to be considered almost or quite negligible as regards infectivity. L. R.

EGYPT MINISTRY OF THE INTERIOR DEPARTMENT OF PUBLIC HEALTH ENDEMIC DISEASES SECTION EIGHTH ANNUAL REPORT 1935 [Leprosy pp 5-6 With Tables 2 & 8]

This report gives a brief account of the extensive Leprosy Colony at Abu Zaabal, where 10 000 square metres of land is available. Development is proceeding actively trees and gardens planted and large quantities of vegetables grown by the inmates who increased during 1935 from 159 to 237. In addition the available beds in the Cairo Leper Hospital have been increased to 75 mainly for female lepers. Further 1 083 patients attended the leprosy units with a total of 8 163 since the leprosy branch was opened and 53.9 per cent of the last years patients were positive ones. The number of sub-clinics for out patients is being increased at no extra cost except travelling expenses. L. R.

SUDAN REPORT OF THE SUDAN MEDICAL SERVICE FOR THE YEAR 1936 [Leprosy pp 15-18]

This report records further progress in the campaign against leprosy in the Sudan. In the Central Sudan new settlements formed near dispensaries have worked well and this system is being introduced on a large scale in the Nuba Mountain districts to provide observation and treatment for a large proportion of the infectious cases. In the most affected southern districts of the Equatorial Province the big and small settlements are functioning satisfactorily and leprosy throughout the Sudan is well under control but improved diet and standards of living will be necessary for its permanent eradication. L. R.

DO PATEO (Duarie) & PEREIRA (Solano) Da frequencia da lepra nos focos familiares. Estudo epidemiologico [The Family as a Focus of Leprosy Infection].—*Brasil-Médico* 1938 Dec. 5 & 12. Vol 50 Nos 49 & 50 pp 1061-1075 1080-1085 With 4 graphs.

With a view of estimating the part played by contact in the epidemiology of leprosy the authors analysed cases reported to them or examined by the health authorities and also the contacts—members

of the same families or those living in the same house—of lepers over a period of 9 years.

Of 9,239 reports sent in 8,474 or 91.7 per cent proved to be negative both by clinical and bacteriological examination 456 (4.9 per cent) showed clinical evidence of infection 190 (2.1) were suspicious and 119 (1.3) were carriers of the organism but did not show clinical signs. Of 15,729 examined by the authorities 14,964 or 94.5 per cent were clinically negative. Though the majority of the contacts who developed the disease showed signs within three years in some cases the interval was five years and even more. The authors conclude that leprosy being largely a family or domiciliary infection for prophylaxis weekly examination of contacts should be made in order that treatment may be started early the only time at which it is likely to be successful and that this examination should be made over a period of at least five years.

H H S

ROGERS (Leonard) *The Epidemiology of Leprosy—Internal Jl Leprosy* Manila, 1936 Oct.-Dec Vol 4 No 4 pp 469-484 [53 ref.]

BOENJAMIN (R.) & SOEDARSONO (R. M.) Een epidemiologisch lepra onderzoek in dessa Tjigobang (Cheribon) [Epidemiological Study of Leprosy in Tjigobang (Cheribon)]—*Geneesk Tijdschr v Nederl Indie* 1937 Sept. 21 Vol 77 No 38. pp 2268-2291 With 1 text fig & 5 figs on 2 plates

CILENTO (Rafael) *Leprosy in Australia and its Dependencies.—Internal Jl Leprosy* Manila 1937 Jan.-Mar Vol 5 No 1 pp 45-52.

This paper gives a good account of the distribution and prophylaxis in Australia. The matter was discussed by the Federal Health Council in 1931 and arrangements made for a survey of the problem and the consideration of the methods of prophylaxis advocated by ROGERS. In the Mandated Territory of New Guinea approximately 500 cases have been confirmed bacteriologically so the problem is a serious one there. In the British Solomon Islands an increasing number of cases are also being detected. An examination of contacts among the natives of Queensland revealed fifteen suspicious cases some of whom have since been isolated at the Peel Island leprosarium. New South Wales reports 18 cases 16 of whom are males. Attempts are being made to carry out periodic examination of contacts but in the case of natives frequent movements and changes of name make it difficult and the present almost penal regulations lead to hiding of such cases so that for the aboriginals only segregation is likely to be efficient as they fear medical treatment so cannot be attracted by its provision. In view of the number of known lepers in Australian territories having increased from 80 to 167 since 1931 more adequate control is advocated through inquiries into the source of infection in all new cases, re-examination of contacts every six months for five years careful records of the cases improved treatment with probationary discharge of cases becoming negative bacteriologically and attention to diet and occupation all measures based on modern advances. The Commonwealth presents a unique opportunity for the study of the factors associated with the spread of leprosy.

L R

RAMOS E SILVA (J) Quatro lições sobre o diagnóstico clínico da lepra. [Lectures on the Clinical Diagnosis of Leprosy]—*Brasil Medico* 1937 Nov 6 13 20 & 27 Vol 51 Nos 45 46 47 & 48. pp 1127-1130 1147-1153 1163-1166 1185-1188. With 13 figs.

This series of four lectures was part of a University Extension course organized by the Centro Internacional de Leprologia. Although they do not bring forward any new matter—they did not profess to—they are mentioned here because of the excellent presentation of the position and of the points with which they were intended to deal. In the first the fundamental diagnostic data are stated and stress is laid on the importance of early recognition of the disease. In the second the special diagnostic points between leprosy and tuberculosis and syphilis. The third is equally important and considers in detail the distinctions between leprosy in its various forms and other dermatological affections and syndromes. In the fourth the diagnosis of concomitant conditions. The lectures are illustrated with good reproductions of clinical cases showing the lesions referred to in the text.

H H S

JUNIOR (Jodo Moraes) O metabolismo basal na lepra. [Basal Metabolism in Leprosy]—*Rev Brasileira Leprologia* S. Paulo. 1937 Sept Vol 5 No 3 pp 287-317 With 1 chart. English summary (6 lines)

The author prefaces the subject of the title of this article by references to basal metabolism in other conditions such as diseases of the digestive, circulatory, respiratory and nervous systems. The apparatus employed was Benedict's as modified by Roth. The tests were carried out on thirty-five patients in the morning, before food, divided into three groups. I. Fifteen quiescent cases. II. Ten in a leprotic reaction. III. Ten who had never had a leprotic reaction. Short note is made on each patient and the author concludes that basal metabolism is always increased in this disease even when no special cause, beyond the lepra infection generally, can be discovered. He found the rate increased by the leprotic reaction. In quiescent cases the rate falls and tends to the normal limits.

H H S

MITSUBA (Kensuke) & NAGAI (Kenji) On Alopecia Leprosa.—*Internat J Leprosy* Manila 1937 July-Sept Vol 5 No. 3 pp 247-252. With 6 figs on 1 plate

The unusual frequency of alopecia in leprosy in Japan is further discussed in this paper. Two kinds are recognized, one occurring in nodular cutaneous and one in macular neural cases, only the former being here dealt with. Both the cases first studied by Mitsuba at the Zensen hospital in 1911 and a larger group collected by Nagai among less advanced patients at Nagai are analysed, the condition having been found in 68.1 per cent of 1051 nodular cases. The loss of hair is seen chiefly over the course of the larger veins but it persists for long over the arteries. This is attributed to the low pressure and slow velocity of the veins and the abundance of perivascular lymph spaces around them producing more suitable conditions for the

development of leprous infiltration the pressure of which around the hair papillae causes malnutrition and atrophy of the hair roots. Photos illustrate the condition. L R

WADE (H W) & FRASER (N D) The Skin Lesions of Neural Leprosy III. Observations in China.—*Internat J Leprosy*. Manila. 1937 July-Sept Vol. 5 No 3 pp 285-308. With 34 figs on 6 plates

The authors report the results of microscopical examinations of leprides from 31 typical cases of leprosy in China on the lines of their former work in other countries in all of which tuberculoid changes in some degree were found. Clinically such lesions were met with in 23 of 225 cases examined. The major changes occurred in males and minor in females. Superficial atrophy of the skin was not found to indicate a retrogressed lesion. Enlargement of cutaneous nerves was found in some major tuberculoid cases and polyneuritic changes were sometimes noted. Certain patients improved markedly under treatment in spite of irregular attendance. L R.

TISSEUT (J) Sur une forme tuberculoïde d'accident primitif de la lèpre [Primitive Tuberculoid Lesions].—*Bull Soc Path Exot* 1937 Nov 10 Vol. 30 No 9 pp 757-760 With 1 fig

This is a brief description of four cases in which a small tuberculoid lesion was considered to be a primary one and possibly the site of infection. Four were in girls and one in a boy, aged from 2 to 7 years. The lesions were small prominent raised red patches with a tuberculoid structure on section in two of which cicatrization was commencing in the centre. They are thought to be primary leprous chancres.

L R

FERNÁNDEZ (José M M) La reacción leprosa tuberculoïde [The Tuberculoid Leprous Reaction].—*Rev Brasileira Leprologia* S Paulo 1937 Dec Vol. 5 No 4 pp 419-463 With 35 figs. [17 refs.] English summary

The author has studied in no little detail the tuberculoid leprous reaction in twelve cases. He describes the condition from the clinical, bacteriological and histological aspects. The evolution of the reaction is subacute without general systemic disturbance. Old lesions become congested and inflamed and new lesions may appear with bacilli. As the reaction diminishes the bacilli usually increase. This was observed in ten of the twelve described and after subsidence of the reaction atrophic maculae remain. The leprotic test was positive in all and the corpuscle sedimentation rate low.

In the acute stage there is intense tissue reaction with lymphocytic infiltration and presence of numerous epithelioid cells. Later in subsidence fibroblasts are numerous and small foci of necrosis are seen but no development into local nodules. The reaction is, says the author, an allergic phenomenon the result of invasion of sensitized tissues by the bacillus or its toxins. The prognosis is favourable. Special treatment is as a rule not required as pain and fever are absent.



Each of the twelve cases is described in detail and the article is illustrated by good photographs of some of the patients and photomicrographs of the histological changes. H H S

RABELLO Jr A Clinico-Epidemiological Classification of the Forms of Leprosy—*Internat J Leprosy* Manila. 1937 July-Sept. Vol 5 No. 3 pp 343-356

The author discusses this question on account of the strong movement against the classification adopted by the Manila conference of 1931. His own suggestion with a comparison with that of LIE is as follows —

Lie's Classification

Our Classification.

Principal forms	<div style="display: inline-block; vertical-align: middle;"> <div style="display: flex; flex-direction: column; align-items: center;"> <div>(T (Tuberosus))</div> <div>(M (Macular))</div> <div>(V (Nervous))</div> </div> </div>	Principal forms	<div style="display: inline-block; vertical-align: middle;"> <div style="display: flex; flex-direction: column; align-items: center;"> <div>L (Leptomatous)</div> <div>M (Macular)</div> <div>A (Tropho-anesthetic)</div> <div>T (Tuberculoid)</div> </div> </div>
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*Complex forms* Combinations of the above forms (the most frequent being LA and MA)

*Other symbols* + bacteriologically positive — bacteriologically negative 1 primary 2, secondary L. R.

WADE (H W) A Proposed Revision of the Memorial Conference Classification of Leprosy—*Amer J Trop Med* 1937 Nov Vol 17 No. 6 pp 773-801 [39 refs]

This lengthy paper discusses a number of classifications of leprous lesions including that of RABELLO above. It should be consulted by those interested in the original as it cannot well be summarized.

L. R

GERMOND (R C) The Classification of Leprosy—*Internat J Leprosy* Manila. 1937 Jan-Mar Vol. 5 No 1 pp 67-70 With 1 fig

- i. DUBOIS (A) DUPONT (Adolphe) CONZEMIUS (E) & DEGOTTE (J.) L'histodiagnostic dans le dépistage de la lèpre débutante. [Histodiagnosis.]—*Ann Soc Belge de Méd Trop* 1937 Sept. 30. Vol. 17 No 3 pp 307-322 [14 refs.]
- ii. VAN BREUGHEM (R) Contribution à l'étude du diagnostic de la lèpre la ponction ganglionnaire [Gland Puncture Diagnosis.]—*Ibid* pp 375-378.
- iii. — Contribution à l'étude du diagnostic de la lèpre les troubles de la sudation. [Sweating in Diagnosis.]—*Ibid* pp. 381-384. With 2 figs on 1 plate
- iv. CHATTERJI (S N) Routine Examination to Diagnose Leprosy—*Med Bull Bombay* 1937 Sept 4 Vol 5 No 17 pp 541-543
- v. LOWE (J) & DHARWENDRA Sternum Puncture in Leprosy A Study of Fifty Cases.—*Leprosy in India* 1937 Oct. Vol. 9 No. 4 pp 121-123.

These five papers deal with various aids to diagnosis.

i. The authors discuss the value of histological examinations of the early lesions of leprosy in making a diagnosis in doubtful cases. From

the examination of 26 definite and 50 suspected leprosy cases they conclude that like other methods it does not furnish certain results in all cases for the characteristic tuberculo-sarcoid changes are not always found. The possibility of confusion with tertiary yaws must be borne in mind but the method is still of value in bacteriologically negative cases

ii The author punctured the inguinal glands and stained the material obtained for acid fast bacilli and granules. In nodular cases large numbers of bacilli typical of Hansen's were always found but they are readily recognized without gland puncture. Of more interest are the maculo-nerve cases including 61 treated and 42 untreated together with 95 non-leper controls with 73.7 per cent 64.2 per cent and 49.4 per cent respectively with negative results so this method proved to be of no diagnostic value in nerve cases of leprosy

iii The author discusses the value of determining the loss of the power to secrete sweat in affected skin in nerve cases of leprosy. After discussing the methods used for eliciting this sign he rejects the use of pilocarpine as not without danger and adopts that of Jurgensen Milnor. This consists in drying the skin to be tested with cotton wool applying a layer of Tr. Iodine letting this dry and then sprinkling the area with starch. On provoking sweating by light exercise the starch becomes blue in the presence of the iodine and the absence of this change in colour will reveal the loss of sweating power of affected skin. Out of 111 cases so tested the reaction was positive in 79 or 71 per cent

iv This is a general discussion of diagnostic method with nothing new in it.

v The authors report on fifty cases in which material obtained by puncture of the sternum was examined for acid fast bacilli in view of the frequency of the invasion of the reticulo-endothelial elements. Leprosy bacilli have been found in the bone marrow by previous workers especially in nodular cases and the authors had confirmed this in a few post mortems on leprosy subjects. Sternal puncture was therefore adopted as a clinical method with the following results. Of 32 cutaneous cases 16 were positive in all of which the skin of various parts of the body was also positive including that over the sternum in 15 but in most of these the bacilli were more scanty in the skin than in the sternal marrow so 50 per cent were considered to be positive on sternal puncture. Of 18 nerve cases however only one was positive with numerous bacilli but none in the presternal skin. They suggest that it would be of interest to determine if the bacilli remain in the bone marrow after the infection of the skin has died out as this might be a possible source of relapses

L R

CLOUSTON (Thomas M.) *Children of Lepers at Nauru—Internal J'l Leprosy*. Manila. 1936 Oct-Dec. Vol 4 No 4 pp 437-440

This paper supplements the scanty available information on the after history of children born to lepers but separated as a rule at once from their parents. It deals with 43 children born to positive leper mothers in the Nauru Island segregation camp. The mortality was rather above the average for the island with 9 deaths (21 per cent) 5 of them under 12 months of age. Of the 34 survivors ten are deducted as under 3 years of age so unlikely yet to show infection and of the remaining 24 five 20 per cent have developed the disease three of them

in an infectious form who were segregated at 9, 7 and 4 years of age respectively but one has been released after three years' treatment. Two other slight nerve cases are being watched. Owing to the great prevalence of leprosy on the island it is not possible to be sure that there was no exposure of these children to infection. Three of them had had family histories, so may have been predisposed to the disease. *L. R.*

- i. SALLE (A. J.) & MOSER (J. R.) Bacteriology of Leprosy. V. Further Isolation Results.—*Internal JI Leprosy* Manila 1937 July-Sept. Vol. 5 No. 3 pp. 253-258
- ii. MCKINLEY (Earl B.) & DE LEON (Walfrido) Mass Cultivation of *Mycobacterium leprae*—*Ibid* pp. 259-266 With 2 plates. [18 refs.]

These two important papers afford confirmation of the cultivation of leprosy bacillus by McKinley and Soule (1932)

i. Salle and Moser have worked in the U.S.A. Carville leper settlement using a culture medium of glycerine veal agar slants with the addition of embryonic chick tissue and minced chick embryo media, and have also used glycerine veal agar in the gas environment of McKinley. Nodules removed aseptically from patients and minced were used for inoculating the culture tubes and positive growth was obtained in 190 out of 311 inoculated tubes and flasks including nodules from every one of the eleven patients tested. Both acid-fast and non acid-fast rods were always obtained, the former being most numerous in young cultures and sub-cultures were readily made but became progressively fewer with the increasing age of the cultures and on transfer to a new medium acid-fast bacilli again preponderated at first. Both morphologically and in their staining properties the organisms were similar to those previously obtained in Honolulu and thus afford confirmation of the earlier work

ii. The cultures described in 1931 by McKinley and Soule have now been carried through sixty generations without showing more luxuriant growth, and they differ in this from all previously described lepra bacilli. The principle of the culture method was based on WHEATY's attempts to grow it in an atmosphere of oxygen and carbon dioxide in 1930. The most successful medium was found to be hormone-glycerol-agar the preparation of which is given in this paper the main purpose of which is to describe a gas tension incubator for mass culture with a view to chemical investigations of the bacilli to allow of fractionation in the hope of finding a protein fraction for employment as an antigen which may be of value for use in an intradermal diagnostic test. This apparatus for the details of which the original paper should be consulted, will contain 2,880 culture tubes. A glass chamber to facilitate aseptic handling of the nodules for inoculation is also described *L. R.*

HENDERSON (Howard J.) A Serological Comparison of the Proteins of Various Strains of Supposed Leprosy Bacilli and Other Acid-fast Bacteria.—*Internal JI Leprosy* Manila 1937 July-Sept. Vol. 5 No. 3. pp. 267-275 With 2 figs. [14 refs.] [Summary appears also in *Bulletin of Hygiene*]

Sixteen strains of chromogenic or non-chromogenic acid fast bacilli isolated from leprosy, were grown in Long's synthetic medium for 8 weeks. The culture fluids were filtered, phenolized and concentrated.

An antiserum was prepared for each strain by injection of rabbits and cross-precipitation tests were put up. Of the 15 strains 13 exhibited a group affinity though each strain reacted most strongly with its own antiserum. Comparisons were then made with other well known acid fast bacilli. A group relationship was found between the main group of leprosy bacilli and *Myco phlei* between Duval's non chromogenic leprosy bacillus and the avian tubercle bacillus between Karlinski's leprosy bacillus and the human tubercle bacillus and between the Levy Kedrowsky leprosy bacillus and *Myco smegmatis* G S Wilson

DUBOIS (A) GAVRILOV (W) & FESTER (A) La bacillémie chez les lépreux comme méthode de culture et comme méthode de diagnostic Bacillaemia in Leprosy — *Ann Soc Belge de Méd Trop* 1937 June 30 Vol. 17 No 2 pp 169-175

DUBOIS (A) La démonstration du bacille de Hansen dans les coupes histologiques [Demonstration of *Mycobacterium leprae* in Tissues — *Ann Soc Belge de Méd Trop* 1937 June 30 Vol. 17 No 2 pp 291-296

LOWE (John) & DHARMENDRA. A Study of *M leprae muris* in Tissue Cultures and in Chick-Embryo Medium.—*Indian Jl Med Res* 1937 Oct Vol. 25 No 2 pp 329-339 27 refs.]

These workers record three years attempts to cultivate the bacillus of rat leprosy in tissue cultures including minced chick-embryo medium but they failed to demonstrate any multiplication of the inoculated bacilli or change of them into non acid fast ones. They were thus unable to confirm the work of MCKINLEY VEDER SOULE and SALLE L R

1. BALFOUR JONES (S. E. B.) The Experimental Transmission of Rat Leprosy to the Golden Hamster (*Cricetus auratus*) — *Jl Path & Bact* 1937 Nov Vol. 45 No 3 pp 739-744 [11 refs.]
11. ADLER (S.) Inoculation of Human Leprosy into Syrian Hamster [Correspondence] — *Lancet* 1937 Sept 18 pp 714-715
111. LAIDLAW (P. P.) Inoculation of Human Leprosy into Syrian Hamster [Correspondence] — *Ibid* Sept. 25 p 773

These important papers record the discovery of an animal that can readily be infected by inoculation with human and rat lepra bacilli.

i. After confirming the susceptibility of the golden or Syrian hamster *Cricetus auratus* to inoculated human and bovine tubercle bacilli the author proceeded to inoculate these animals both intraperitoneally and subcutaneously with saline suspensions of fresh material from a rat infested with rat leprosy. He obtained extensive infection of the liver spleen glands and in some cases also of the lungs and kidneys with numerous acid fast bacilli in the lesions indistinguishable from those of rat leprosy. The disease was also carried on to further animals by inoculation leaving no doubt regarding positive results having been obtained.

ii. As the result of a suggestion of Sir Patrick Laidlaw Adler has carried out intraperitoneal inoculation of the Syrian hamster (*Cricetus*

*auratus*) which has the advantage of breeding in captivity with aseptically removed human leprous nodules containing very numerous acid-fast bacilli. Positive results were obtained in three out of four previously splenectomized hamsters, for nodules in the animals contained much more numerous lepra bacilli than had been injected, showing multiplication in the system and they were also found in liver smears from one indicating generalization of the infection. All three animals showed heavy infections within six weeks of inoculation. The fourth was found dead and unfortunately putrefaction was too far advanced to allow of examination.

In Sir Patrick Laidlaw writes to point out that to BALFOUR JONES is due the credit of first infecting hamsters with rat lepra bacilli for he demonstrated sections of infected hamsters before the Royal Society of Medicine on March 3rd and before the International Congress for Microbiology on July 29th both in 1936.

L. R.

NANAJYO (Suketoshi) & SUZUKI (Rinsun) Ueber die Zuchtung von Tuberkelbazillen aus den Auswürfen von Leprösen. [Cultivation of Tubercle Bacilli in Lepers.]—*Tohoku Ji Experim Med* 1937 Aug 31 Vol 31 No 5 pp 431-436 [12 refs.]

The authors report on the examination of the sputum of 100 cases of leprosy for tubercle bacilli. In 30 cases positive results were obtained. In a number of sputa containing acid fast bacilli none could be grown. In positive cases a longer time was required for the growth of tubercle bacilli than in the purely tuberculous cases.

L. R.

ANDERSON (R. J.) REEVES (R. E.) & CROWDER (J. A.) The Chemistry of the Lipids of Tubercle Bacilli. LII. The Composition of the Acetone-Soluble Fat of *Bacillus leprae*.—*Jl Biol Chem* 1937 Nov Vol 121 No 2 pp. 680-684 [10 refs.]

This technical chemical paper is best summarized in the authors own words —

1. An investigation has been made of the chemical composition of the acetone-soluble fat of *Bacillus leprae*.

"2. The crude fat was found to be a complex mixture of free fatty acids and neutral fat.

3. The neutral fat consisted apparently of fatty acid esters of the disaccharide trehalose. No glycerol could be found.

4. The fatty acids were composed of ordinary solid saturated acids, unsaturated solid acids, unsaturated liquid acids and saturated optically active branched chain acids.

5. Three different substances possessing phenolic properties were isolated.

"6. The ordinary saturated fatty acids were represented by caproic, myristic, palmitic, stearic, arachidic, behenic and tetra cosanoic acids. Certain new optically active higher acids were also present but could not be definitely identified.

7. Among the unsaturated acids examples of  $C_{14}$ ,  $C_{16}$ ,  $C_{18}$ ,  $C_{20}$ ,  $C_{22}$  and apparently  $C_{24}$  and  $C_{26}$  were found.

8. A series of new dextrorotatory branched chain saturated acids apparently of the  $C_{18}$ ,  $C_{20}$  and  $C_{22}$  series was isolated.

L. R.

FICKER (Martin) Methoden der Komplementbindung und Flockung bei Lepra. [Complement Fixation and Flocculation.]—*Arch f Hyg u Bakt* 1937 Vol. 118 No 5/6 pp 362-368

This paper deals with the technique of the preparation of antigens from lepromata of rats and man from acid fast bacilli cultivated from man and thirdly from other acid fast bacilli. It contains nothing new

L R

MONTHLY BULLETIN OF THE BUREAU OF HEALTH Manila. 1937  
July Vol 17 No 7 pp 265-275—Summary Report on Antigenic Skin Tests in Leprosy

This is the report of a Philippine Commission on an elaborate series of intradermal skin tests with various bacteriological products with a view to finding a reliable diagnostic method and at the same time to determine if any one of the bacteria from which the products were derived is likely to prove to be the causative organism of leprosy. The substances tested include protein polysaccharide phosphatide leprosin (wax) and leprosinic acid derived in Dr Anderson's U.S.A. laboratory from laboratory strain No 370 of the so-called *M leprae* isolated from a case of leprosy in Honolulu about 1909. Also antigens of tuberculin protein trichloroacetic acid precipitated from a group of acid fast bacilli some of which are suspected to be strains of *M leprae* all prepared by Dr Long as well as similar preparations from different types of tubercle bacilli and other acid fast organisms including those of Duval Dames and Karlinski derived from leprosy cases. Some of these various acid fast organisms show cross serological reactions indicating affinity between them. The supposed leprosy strains of McKinley and Soule were also included the first named being a member of the commission.

A total of 5174 skin tests were carried out with products from suspected leprosy organisms and also over 4000 with those of the tubercle bacillus and in no case did the positive reactions in leprosy patients exceed the negative ones. The conclusions are therefore negative but the commission feel that the tests cover the now existing possibilities and so clear the ground for work on new lines. L R.

WOODMAN (H M) Some Results of Treatment of Leprosy in the Southern Sudan—*Trans Roy Soc Trop Med & Hyg* 1937 Apr 19 Vol. 30 No 6 pp 631-638 [10 refs.]

This paper summarizes the results of the modern treatment of leprosy over a period of six years in the largest leprosarium in Africa with 3,500 cases. The conclusions are best given in the author's own words—

Definite evidence is given in favour of treatment with chaulmoogra derivatives over a period of 3 to 4 years.

After this period further treatment appears to be of little or no avail except in special cases.

A big proportion of early cases become arrested without interference but are assisted to do so by treatment.

No method of treatment so far employed holds out much prospect for the advanced C3 cases whose destiny when they survive is generally the maimed and disabled N2 stage.

The settlements are effective in removing the chief foci of infection from the district and in centralizing and simplifying the control of cases.

In spite of the great incidence of leprosy it is important to note that only 10 per cent of cases are any danger to their neighbours, as far as can be at present judged in the absence of repeated and exhaustive laboratory examinations

L. R

SCHLOSSBERGER (H) *Chaulmoograol und Verwandtes*. [*Chaulmoogra Oil and its Allies*.]—Reprinted from *Handbuch der Experimentellen Pharmakologie* Vol. 5 127 pp With 1 fig [Numerous refs]

This is an adequate and comprehensive account of the history botany chemistry and therapeutical applications of the anti-leprotic oils obtained from the seeds of a large number of species belonging to a few genera in the botanical family Flacourtiaceae. The best known of these oils are chaulmoogra hydnocarpus and sapucamba which are widely used as such, or in the form of sodium salts (soaps) or ethyl esters of the fatty acids, but there are a considerable number of other less known oils, belonging to the same group the use of which is sometimes advocated in the areas in which they are found mainly from motives of economy or local interest. The constants of a large number of these oils are known and Dr Schlossberger has rendered no small service in bringing together in this monograph a vast amount of botanical and chemical information concerning them from sources not readily accessible.

The pure chemistry of chaulmoogric and hydnocarpic acids the constituents to which these oils owe their therapeutic value also receives adequate attention and a particularly interesting account is given of the derivatives and allies of these acids, which have been synthesised but which have so far not proved to be of special therapeutic value.

Two-thirds of the monograph deals with therapeutic applications. No less than 20 pages are devoted to describing the mixtures derivatives and proprietary preparations which the ingenuity of leprologists and chemists has evolved from these comparatively simple drugs. Copious references to clinical trials conducted with most of these things are also provided. This section is followed by chapters on the bactericidal action of these drugs, and on various aspects of their pharmacology on which a surprising amount of work has been done.

The monograph is a tribute to Dr Schlossberger's patience and industry and to his remarkable gift for extracting the essentials from a mass of literature and presenting it in concise and illuminating form.

T. A. Henry

COLL (Howard Irving) & CARDOSO (Humberto) *Relation of Irritation to Method of Manufacture of Ethyl Esters of Chaulmoogra Oils*.—*Internat J Leprosy Maima* 1937 July-Sept. Vol. 5 No. 3. pp 277-283 With 1 fig

The authors report the results of an investigation to find the method of making the least irritating esters of *Hydnocarpus wightiana* oil. They have found that the irritant effect of their injections is due

mainly to decomposition of the esters on standing for long. This can be reduced most by neutralization and also by blowing out with steam for two hours to remove volatile impurities filtering and drying. The addition of iodine or 4 per cent creosote is also essential. The best result was obtained by using both neutralization and blowing out with steam. There is not much variation in irritant effects of esters prepared by the Culon 48 or 8 hour method of esterification and by the cold sunlight method. L R

ROY (A T) **Apparatus for Leprosy Clinic.**—*Indian Med Ga.* 1937 Sept Vol. 72. No 9 pp 544-545 With 3 figs

This is a short paper describing and illustrating apparatus for keeping hydnocarpus oil at a constant temperature from which it can be drawn into syringes for injection L R

PAGET (Humphrey) **The Liquid Acids of Sapucainha Oil.**—Reprinted from *Jl Chem Soc* 1937 June pp 955-960

This is a highly technical paper dealing with the oil of *Carpotroche brasiliensis* used in the treatment of leprosy in Brazil which contains the characteristic chaulmoogric and hydnocarpic acids and also a considerable liquid fraction which is the object of this research. It should be read in the original by those interested L R

LOWE (J) & CHATTERJI (S N) **Experiments in the Treatment of the Trophic Lesions of Leprosy by Injections of Hydnocarpus Preparations.**—*Leprosy in India* 1937 Oct Vol. 9 No 4 pp 115-120 With 18 figs (16 on 8 plates)

This paper deals with the treatment of such trophic lesions as ulcers on the sole of the foot ulnar paralysis leading to claw hand paralysis of cranial nerves leading to eye troubles and foot-drop due to peroneal paralysis and it is illustrated by photos of cases. The foot ulcers are associated with leprosy infiltration of the tibial nerve at the ankle so hydnocarpus injections were given along the course of that nerve in addition to intradermal and subcutaneous ones around the ulcers. Fifteen such cases were treated for a year with reduction of the pain and healing of seven even where necrosis of bone was still to be detected by crepitus and in the other eight the ulcers were smaller. Surgical decapsulation of thickened tibial nerves only reduced the pain without inducing healing. Improvement was obtained by similar injections in some cases of paralysis of other nerves and it is considered that the method described is worthy of further trial. L R

MARCHOUX (E) & CHORINE (V) **Traitement de la lèpre par le tellure.** [**Tellurium in the Treatment of Leprosy**].—*Bull Acad Méd* 1937 July 20 101st Year 3rd Ser Vol. 118 No 27 pp 86-93

This is an important investigation of the action of tellurium in the control of rat leprosy infections. The pure metal was suspended in oil or in serum glucose and sodium tellurite has also been used. The injection of the metal in small easily borne doses such as 0.04 gramme in four doses before infection with rat leprosy retards the development



American States of Colombia and Venezuela (see this *Bulletin* 1934 Vol 31 p 263 1936 Vol 33 p 614) The beneficial results he found to follow its use include diminution in the size of nodules, change in the colour of affected skin towards the normal improvement in nasal symptoms, anaesthesia, nerve pains paralysis oedema and return of the temperature in febrile cases to normal. Slight febrile reaction follows its use but the rise of temperature is not considered to be sufficient to account by itself for the improvement seen. Most of the patients received only three intragluteal injections of 10 cc. each in the course of a week and the serum did not appear to be harmed by two months exposure to tropical heat. It is still too early to form an opinion regarding the effects of several years treatment of cases, and the author does not expect it to bring about cures by itself but its rapid and favourable action on leprous manifestations observed by more than 20 physicians in different countries after the failure of chaulmoogra preparations entitled him to assume that his serum ought to be a good auxiliary to the standard therapy with chaulmoogra which is all he has claimed from the first L. R

WAYSON (N E) Cutaneous Leprosy Presumable Cure by Surgical Removal of a Lesion.—*Arch Dermat & Syph* 1937 Dec. Vol 36 No 6. pp 1185-1186

The patient was a French priest, aged 61 who had worked for eight years in the Kalaupapa leper settlement of Hawaii, and had been notoriously careless in cleaning his hands after contact with leper patients and he habitually rubbed the tips of his fingers on the central portion of his forehead when reading. Three typical leprous nodules about 1 cm in diameter developed at this site and contained acid-fast bacilli. They were removed several weeks after their appearance and showed clumps of acid fast bacteria. As four years have since elapsed without the appearance of any further manifestations it would appear that he may be cured.

Reference is made to a similar case of McCoy in a child operated on sixteen years ago and the interesting information is added that this patient has also remained free from further symptoms. The author recognizes that it is too early in the case now reported to regard the cure as permanent L. R.

TISSEUIL (J) Heureuse action de la yohimbine sur la laryngite des lépreux [Yohimbine in Laryngeal Leprosy].—*Bull Soc Path Exot* 1937 Oct 13 Vol 30 No 8 pp 634-635

The author records four cases of laryngeal leprosy in which rapid relief to respiration and general improvement followed the oral administration of 2 to 4 granules of yohimbine daily for ten days L. R.

VAN BREUSEGHEM (R) Essai de traitement de la lèpre par un colloïde de synthèse associé au bleu de méthylène [Treatment of Leprosy with a Colloid Preparation of Methylene Blue].—*Internat J Leprosy Mania* 1937 Jan-Mar Vol 5 No 1 pp 73-75

SITAKALA (J B) Melanitschbend [Leprosy].—*Geneesk Tijdschr v Nederl Indie* 1937 Sept 14 Vol 77 No 37 pp 2233-2246. With 3 figs. on 1 plate.

CHORINE (V) & BERNY (P) Infection génitale des rats avec le bacille de Stéfansky [Infection of Rats with Stéfansky's Bacillus by the Genital Route]—*Internat J Leprosy*, Manila 1937 July-Sept Vol 5 No 3 pp 309-310

MARCHOUX and SORAL have reported the infection of a male rat in the prepuce by rat leprosy containing material. The present writers record the successful infection of female rats by placing infected material in the vagina as well as positive results in males. No chancre at the site of infection was observed but the mucous membrane was traversed by the organisms and general infection resulted. They suggest a similar possibility in the case of the human subject. L. R.

SATO (Masaru) Rattenlepra. II Teil Uebertragung auf Tiere. 'Rat Leprosy II. Transference to Other Animals'—*Japanese J Dermat & Urol* 1937 Sept 20 Vol 42 No 3 pp 149-163 With 34 figs

This well illustrated article describes the lesions of rat and mouse leprosy. Further the author found that no infection is produced in rabbits and guineapigs but in the case of hens more or less distinct nodules with a histological picture differing little from that of leprosy can be induced by the inoculation of rat leprosy material. L. R.

GRALL (A.) Le blocage du système réticulo-endothélial dans la lèpre murine [Blockage of Reticulo-Endothelial System in Rat Leprosy]—*Bull Soc Path Exot* 1937 Oct. 13 Vol 30 No 8 pp 636-643

Intravenous injections of carmine Chinese ink and animal charcoal respectively were given very shortly before intravenous injections of fine emulsions of rat leprosy bacillus infection to determine the effect of blocking of the reticulo-endothelial tissues on the evolution of the disease. The difference between the degree of infection in the blocked and in the control animals proved to be very slight as regards the common infection of the liver and spleen thus induced. L. R.

MARCHOUX (E) CHORINE (V) & KOEHLIN (D) Le bacille de la lèpre et le système nerveux [Stéfansky's Bacillus and the Nervous System.]—*Ann Inst Pasteur* 1937 Dec Vol 59 No 6 pp 549-576 With 15 figs.

Rats may survive the injection of the bacillus of Stéfansky into the cerebral membranes and even into the brain itself in some cases. The cerebral membranes especially the dura mater rapidly become affected and it may extend into the ventricular membranes and also always affects those of the optic nerves. Infection of the eye may also extend to the cerebral membranes. Lepromes may develop in the nervous substance of the brain with involvement of the vascular endothelium and perivascular tissues. If the bacilli gain access to the sciatic nerve the adjacent lymphatics are much affected. Symptoms of meningeal irritation may be observed. L. R.

that the trial instituted in Assam has not been conducted on a strictly controlled basis. As regards the results of treatment at the Campbell Hospital Calcutta it records the judgment that analysis of the figures shows no appreciable difference in the death rate of cases treated by bacteriophage and the control series but that a certain value attaches to bacteriophage treatment added to ordinary methods of treatment when only the figures for cases in which agglutinable vibrios were isolated are taken into account.

### III.—Preparation of Cholera Vaccine

The view of the consultative committee is that the strains of vibrio used should (1) be smooth and translucent (2) form stable suspensions in normal salt solution (3) have the serological characters of group O No 1 GARDNER and VENKATRAMAN subtype Inaba and agglutinate to a significant titre with serum prepared from the dedicated Inaba O antigen provided by the standards laboratory of Oxford (4) ferment mannose and saccharose but not arabinose (5) not be haemolytic (6) be isolated from cases of cholera during an epidemic (7) be highly stable even in subculture

W F H

GARDNER (A D) & WHITE (P Bruce). Résumé des résultats obtenus dans l'Inde par l'emploi des sérums O agglutinant le vibrio cholérique préparés avec des antigènes O standard provinciaux (Results obtained in India by the Use of "O Sera Agglutinating the Cholera Vibrio prepared with Standard "O Antigens").—*Bull. Office Internat. d'Hyg. Publique* 1937 Sept Vol 29 No 9 pp 1855-1884

I Introduction [By A D GARDNER].—Much of this communication is commentary on reports from India. Conclusions arrived at are: The facts submitted fully confirm that the serum containing specific O agglutinins but no H agglutinins will separate a group of vibrios, which are without doubt causally related to epidemic cholera from other vibrios whose pathogenic action is at least doubtful. This is a very important finding for the investigation of carriers. Again all the specific vibrios give the type I Herberg reaction fermenting mannose and saccharose but not arabinose. The reaction is not specific to the cholera vibrios but is valuable as an adjuvant reaction in these reports. Thus the El Tor question regarding agglutinable O vibrios which are at the same time haemolytic does not arise in this case. As haemolytic O vibrios are absent in those regions where bacteriophage has been distributed it may be inferred that even if under the action of bacteriophage this will not lead to errors of diagnosis in the regions concerned. A bivalent or mixed O serum may be used for current diagnosis and a pure O serum reserved for scientific or epidemiological research.

II Commentary on negative and doubtful results of bacteriological researches in clinical cholera [By P Bruce WHITE].—In the case of original isolation cultures it is quite possible that the presence of

cholera phage may be capable of reducing not only the absolute numbers of *V. cholerae* present but also their numbers relatively to insensitive secondary invading vibrios. This will seriously interfere with the isolation of the primary organism or with its recognition in a form reacting to an O antiserum.

The variant cholera form is an important form and the situation as regards this type may be summarized as follows—(1) Certain variants selected by the lytic action of the cholera phages B and M can show reduced agglutination to an O anticholera serum. When that agglutination is doubtful or partial absorption tests should be applied. (2) The rough variant of the cholera vibrio emerging from the action of cholera phage A and which is devoid of specific polysaccharide is not agglutinable by a smooth O cholera serum. It is agglutinable by 0.85 per cent. salt and higher concentrations and should be studied serologically in a suspension of 0.4 per cent. salt. It must not be assumed because the rough form only has been isolated from a case of cholera that it is the pathogenic vibrio or that the smooth form is not the real cause of cholera. The selective action of the A cholera phage must always be born in mind during isolation of the cholera vibrio. By the simple process of absorption of a cholera serum with a P race of the cholera vibrio (the most degraded form without the rough polysaccharide) a serum can be obtained which is without action on smooth vibrios or heterologous rough races but can agglutinate exclusively or almost exclusively the rough strains of the cholera vibrio and the El Tor vibrio.

B F H

POPESCO-COMBESCO (Cornelia) & WISNER (B). Contribution à l'étude des vibrions cholériques et paracholériques. [Study of the Cholera and Paracholera Vibrios]—*Arch. Roumaines Path. Expér. et Microbiol.* Paris 1937 June. Vol. 10 No 2 pp 111-143. With 2 figs. [28 refs.]

The original purpose of this study was to find an agglutinating serum which should be strictly specific and enable workers to identify rapidly and accurately the cholera vibrio. Such a purpose necessitated simultaneous study of the characters of the various types of cholera and paracholera vibrios. An excellent summary with conclusions is given of the work done to date which is itself a continuation of much previous published work.

*Summary and conclusions*—The authors have studied 110 strains of vibrio from a great many sources. (1) Morphologically they find it impossible to lay down absolute characters for the cholera vibrio. A single terminal cilium is not exclusive to cholera vibrios but the possession by a vibrio of several polar cilia serves to distinguish with certainty a vibrio deprived of fermentative power on glucosides from those which possess this property. (2) As regards biochemical characters there are three to be considered—indole formation, haemolytic action and the fermentation of sugars. Indole production is common to the vibrios of true cholera and to the vibrios of other affections but again vibrios deprived of power to ferment sugars differ by being indologenic. Haemolytic action of a vibrio is very important. If a vibrio fails to haemolyse a suspension of goat erythrocytes and is agglutinated by specific serum it may be certainly taken to be a true cholera vibrio. Under the third heading of sugar fermentation much stress is laid on the method proposed by HEIBERG

Of the vibrios tested all those which serologically formed part of the group I O of GARDNER and VENKATRAMAN belonged equally and exclusively to Heiberg's group I (3) Alteration of character by bacteriophage action is given in the statement — Apart from the modifications concerning their lysability (lysoresistance) and their haemolysing property (erythrocytes of rabbit and man) we have not been able to observe any other modification of initial characters

(4) Several specific agglutinating sera were at the disposal of the authors. All vibrios derived from true cases of cholera as well as those isolated in Irak from carriers were agglutinated by all the sera. Of the 19 El Tor strains some few were agglutinated by some of the sera the remainder were not agglutinated. The agglutinations were performed at 37°C and so H agglutinations were excluded. (5) Rabbit agglutinating sera were prepared to each of the El Tor vibrios. Crossed agglutination tests showed that this group was antigenically very heterogeneous. Some of the El Tor sera were even capable of agglutinating vibrios which had no fermentative action on sugars. (9) All the agglutinable vibrios, with only one exception gave a positive Pfeiffer test *in vitro* H F H

BERNARD (P Noël) GUILLERM (Jean) & GALLUT (Jean) Sur une diastase hém digestive du vibron cholérique. [A Haemodigestive Ferment of the Cholera Vibrio.]—C R Soc Biol 1937 Vol 126 No 25 pp. 180-182

The ferment is one causing clearing of the blood agar on which the cholera vibrio is grown. This process is regarded as haemo-digestion. Isolation of the ferment was effected by extracting it from the medium of growth and not from the vibrio itself. In fact the vibrio bodies do not contain it. The medium first used to provide the ferment after the vibrio had been grown on it for 3 or 4 days, was sold Peptone Chapoteaut 2 salt 0.5 well washed agar 3 water 100. It was found, however to be easier to obtain the ferment from a nutrient bouillon after 8 days culture. IV F H

BERNARD (P Noël) GUILLERM (Jean) & GALLUT (Jean) Extraction et propriétés d'une diastase hém digestive du vibron cholérique —C R Soc Biol 1937 Vol 126 No 26 pp 303-305

BERNARD (P Noël) GUILLERM (Jean) & GALLUT (Jean) Action d'une protéidase du vibron cholérique sur les matières protéiques dénaturées et naturelles [Cholera Protase.]—C R. Soc Biol 1937 Vol. 126. No. 27 pp. 394-395

The protease ferment obtained from a cholera culture (see above) when tested for its action on denatured protein such as coagulated horse serum, gelatin, peptone milk, polypeptides or on natural proteins such as egg white and fibrin exerts a tryptic dissolving action on them extending to the production of tryptophane but not to indole. IV F H

BERNARD (P Noël) GUILLERM (Jean) & GALLUT (Jean) Action d'une protéidase du vibron cholérique sur ce même vibron. [Action of Cholera Protase on the Vibrio.]—C R Soc. Biol. 1937 Vol. 126. No. 28 pp 478-480

The protease (see above) isolated by the authors has been tried for its effect on the cholera vibrio under three conditions

and for a wide pH range. Their results are summarized as follows — The digestive action of the cholera vibrio protease is (1) total on the proteins of vibrios heated at 100°C in acid neutral and alkaline medium with a maximum action in neutral medium (2) total on the proteins of vibrios heated at 56°C in a feebly alkaline medium (3) partial on the proteins of living vibrios with individual variations according to the strain in feebly acid medium *W F H*

BERNARD (P Noël) GUILLERM (Jean) & GALLUT (Jean) Action d'une protéidase du vibron cholérique sur les hématies. [Action of Proteidase of the Cholera Vibrio on Erythrocytes.]—*C R Soc Biol* 1937 Vol 126 No 29 pp 563-570

Experiments are described of the action of the cholera proteidase isolated by the authors (1) upon sheep erythrocytes in suspension and (2) incorporated in nutrient agar. The red colour of the sheep blood is transformed to a yellow-green indicating the reducing action of the diastase which has transformed the haemoglobin to haematin. The proteidase has digested the protein of the erythrocyte without attacking or hydrolysing the other constituents. The conclusion is drawn from the experiments that the cholera proteidase does not possess haemolytic power. It brings about in successive stages the phenomenon of haemodigestion as described by VAN LOGHEM.

*W F H*

MARRAS (F M) Studio comparativo fra i caratteri batteriologici del vibrione di El Tor isolato durante il pellegrinaggio del 1936 e i caratteri batteriologici del vibrione del colera [Vibrio El Tor and *Vibrio cholerae*]—*Ann di Med Nav e colon* 1937 Sept-Oct. 43rd Year Vol. 1 No 9-10 pp 407-414

As a result of 6 124 examinations at El Tor during the pilgrimage of 1936 there were isolated six vibrios which agglutinated with 2 sera in dilution of 1-1 000 to 1-1 600. These two sera were O and O+H cholera sera. All six vibrios were indole positive strongly haemolytic to sheep erythrocytes and had been obtained from healthy individuals or from individuals who had come to hospital for an ordinary malady. Five of those vibrios formed the subject of investigation the sixth was rejected because it was autoagglutinable.

The author concludes that none of the serological tests suffices to distinguish the cholera vibrio from the El Tor vibrio. In both of them the O and H agglutinins are the same. Apart from the haemolytic character of the El Tor vibrio the two types are differentiated because the El Tor organism does not produce the symptoms of cholera and is not possessed of the epidemiological characters of the cholera vibrio.

*W F H*

LINTON (R. W) Report of the Cholera Carrier and Structural Enquiry. —*Ann Rep All India Inst of Hyg & Public Health Calcutta* 1936 pp 41-44

In this report a useful summary and survey of the cholera vibrio question from the point of view of chemical architecture is presented. Variability of vibrios investigated by the single-cell technique has

shown that an organism possessed of a given protein and polysaccharide can be transformed into one having a protein and polysaccharide of entirely different type. The resulting organisms are given the rank of strains or variants and as is pointed out the original strain becomes two strains each having distinct chemical structure. At the same time the serological biochemical and metabolic characteristics of the variant differ from those of the original and resemble those of the new group into which the variant now falls. Metabolism technique has been applied to over 300 vibrio strains. The association of metabolic activity with chemical groups appears to be reasonably constant and it changes in parallel with any change of chemical structure in the course of variation. The groupings are set out as—

(1) Chemical groups I, II and VI from cholera cases and contacts, with protein I and a high metabolism. (2) Chemical groups IV and V from carriers both in India and El Tor with protein II and intermediate metabolism. (3) Chemical group III from water vibrios with protein II, a low metabolism and a different polysaccharide from groups IV and V. If it can be shown that variations such as these can occur not only in the laboratory but also in the field an answer should be found to the vexed question of whether cholera cases arise only from previous cases and from contacts with these cases or whether the chronic carriers of groups IV and V can on occasion start epidemics.

IV F H

ABE (S.) On the Growth of Intestinal Pathogenic Organisms, especially of Cholera and Cholera-like Vibrios in Culture Media containing Decoction of Mulberry Leaves.—*Tansu Isakura Zasshi* (Jl Med. Assoc. Formosa) 1937 July Vol 36 No 7 (388). [In Japanese pp 1478-1496 With 1 coloured plate English summary p 1496]

In a fluid culture medium prepared by the addition of peptone and salt to a decoction of mulberry leaves it was found that cholera and cholera-like vibrios grew with the production of acid while dysentery and salmonella groups of bacilli did not. The mulberry leaves contain saccharose which is fermented with the formation of acid and this fermentation accounts for the difference in behaviour of the two groups of organisms.

IV F H

MACDONALD (Ward J.) FRISZEE (Frances C.) & KRUMWITZ (Elma) The Lysis of Vibrio Comma by Bacteriophage and by Immune Serum.—*Jl Infect Dis* 1937 Sept-Oct Vol 61 No 2 pp 222-227 With 10 figs (8 coloured on 1 plate)

An attempt is made to find morphological elements in the bacterial cells undergoing bacteriophage lysis which are not recognizable in the same cells undergoing immune serum lysis. As a basis of this research there is the proposed simple definition of a bacteriophage as "a minute particulate living being capable of growing and multiplying within a larger living cell, capable also of producing soluble enzymes which may act upon the bacterial structure and may diffuse in solution through the medium. The technique employed in the contrasted systems was—to examine microscopically after staining (1) centrifuged sediment of vibrios incubated for 4 hours with cholera immune serum and human complement (2) centrifuged sediment of vibrios incubated

for 3½ hours with bacteriophage. An excellent coloured plate shows the different appearances in the two cases. In the summary of the paper we read — the phenomenon of lysis of *Vibrio comma* due to bacteriophage action and that due to action of immune serum are similar as regards the macroscopic picture. The similarity in lysis ceases here. It has been repeatedly shown that lysis due to bacteriophage may be transmitted in series while lysis due to immune serum may not. Microscopic study of the centrifugalized sediments reveals characteristic differences also. There is a very marked variation in size and form of the vibrios grown with the bacteriophage beginning at 2½ hours and reaching its maximum at 3½ hours. Immune serum causes no appreciable enlargement of the vibrios up to 4 hours. The intracellular granules which retain the blue of the Castenada stain are abundant in the cholera vibrios altered by bacteriophage but analogous granules cannot be recognized in the vibrios exposed to lytic serum nor in the control preparations. The possibility that these granules represent the particles endowed with the property of reproduction and with the property of secreting the lytic enzymes of the bacteriophage principal is worthy of consideration.

W F H

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## DEFICIENCY DISEASES.

- LAL (R. B.) ROY (S. C.) GHOSAL (S. C.) Investigations into the Epidemiology of Epidemic Dropsy Part I. Introductory Notes and a Historical Survey [LAL & ROY] *Indian J Med Res* 1937 July Vol 25 No 1 PP 163-178 [88 refs.] Part II. A Summary of Field Studies [LAL & ROY]—*Ibid* PP 177-213. With 2 maps Part III. Some Laboratory Studies on Rice as the Aetiological Agent [LAL, ROY & GHOSAL]—*Ibid* PP 215-232. Part IV. Experiments to test the Validity of Infection Theory in a Semi-isolated Community [LAL & ROY]—*Ibid* PP 233-239. With 2 diagrams Part V. Feeding Experiments on Human Volunteers [LAL & ROY]—*Ibid* PP 239-259 With 1 plate.

A review of the literature shows epidemic dropsy as one of the major medical problems in the three eastern provinces of India and particularly in Bengal. Three main theories of aetiology have been proposed (a) it is caused by a toxic factor present in diseased rice (b) a toxic substance in some samples of mustard oil is responsible (c) the disease is a contagious infection. The first of these theories claimed most support but for none of them was completely convincing evidence available. A fairly extensive investigation into the circumstances of an epidemic in Bihar during 1935-36 gave data that failed to support the rice theory or that of contagious infection. The observed facts could best be explained on the hypothesis that epidemic dropsy is due to a deleterious substance present in certain supplies of mustard oil.

In the third part of the report it is shown that an inefficient technique was responsible for the previous recording of opacity in rice grains as resulting from infection with *B. vulgaris*. It is further noted that rice that appears to be equally opaque is consumed in parts of India where epidemic dropsy does not occur. A small outbreak amongst the wardens of a jail was closely studied and an endeavour was made to facilitate any contagious infection. No evidence in support of the contagious theory was obtained, but it cannot be said that infection was ruled out as a cause. Three experiments on a small number of human volunteers were designed to test the effect of suspected samples of mustard oil. The first experiment gave no positive results. In the second experiment two subjects out of six developed signs and symptoms strongly suggestive of epidemic dropsy, the interpretation is however not entirely simple since these two had also received so-called "diseased" rice. In the third experiment all the oil developed well marked characteristics of epidemic dropsy while none of the control group were affected. No evidence of adulteration was obtained by chemical examination of the sample of the oil used. Apart from the fact that the harmful substance withstands the high temperature of cooking and that it is presumably of chemical nature no evidence of its origin or nature is at present available.

H N H Green

CHOPRA (R. N.) DAS (N. N.) & MUKHERJEE (S. N.) Studies on the Aetiology of Epidemic Dropsy Effect of Plasma on Tissue Culture and Chorio-allantoic Membranes of the Chick.—*Indian J. Med. Res.* 1937 July Vol 25 No 1 pp 261-266 With 6 figs on 1 plate

Plasma from acute cases of epidemic dropsy showed some toxic action on heart tissue cultures with gradual inhibition of movement and cessation in 72-90 hours. The explants grew less rapidly and growth ceased in 7 days. In the controls movement continued up to the 14th day and the tissue survived to the 17th day. The inhibition of tissue growth was associated with fatty degeneration in the cells and the appearance of cytoplasmic granules after vital staining. Inhibition of movement occurred in 90 per cent of the cases studied whilst cytoplasmic changes were only present in 25 per cent. These changes occurred in new explants up to the 5th passage in some cases with inhibition of movement and growth and the presence of cytoplasmic granules. No toxic effect was observed on embryonic liver and spleen tissue. Two or three white macroscopic patches were seen in about one-fifth of the cases when the chorio-allantoic membrane was treated with plasma. This effect was again transmissible up to the 4th or 5th passage. These patches were similar to those produced by the virus of *laryngo-tracheitis* in birds but were smaller and fewer in number. The presence of a toxic agent in the plasma of active cases of epidemic dropsy is therefore considered established but its nature virus or otherwise is not yet established.

H. N. H. Green

ENESCU (M.) & RADENSCHI (A.) Contribuțiunile la studiul alimentației țărănilor moldovene cu observațiuni asupra regimului pelagrosilor [*Pellagra and the Food of the Moldavian Peasant.*]—*Rev. Igienă Socială* Bucharest 1937 Sept. Vol 7 No 9 pp 449-472 French summary

The authors made an exhaustive day to-day study for the space of twelve months of the food ingested by four Moldavian peasant families numbering 6, 10, 11 and 6 persons respectively and calculated the calorie value for each of them of protein, fat and carbohydrate. At the same time notes were made of the work done by the individual and his health.

The chief article of diet is *mămăliga* made from maize flour consumed in quantities from 1½ to 3 kilograms a day to the total exclusion of bread. Beans take second place and were eaten on 133 to 220 days in the year followed by potatoes, onions, cabbage, carrots etc. and a large amount of nettles. The average milk consumption was about 59 litres per person per annum. Meat in the form of pork and chickens varied between 30 and 78 kgm. per family. Eggs and fat only played a small part in the dietary, the same being true of imported foods like rice and olives. Fruits are taken chiefly cooked except the dried plums.

In family No. 1 were two pellagrins aged 57 and 78 years respectively.

Other articles will be published later.

H. S. Stannus

SLATINEANU (A.) BALTRANU (I.) POTOP (I.) & FRANCHE (M.) Sur la teneur en phosphore en calcium et en potassium dans le sang des pellagres. [The Phosphorus, Calcium and Potassium Content of the Blood of Pellagrins].—*C. R. Soc. Biol.* 1937 Vol. 128 No. 31 pp 811-813

Twenty-one cases of pellagra were investigated they showed either the erythema alone or erythema plus gastro-intestinal troubles or gastro-intestinal and mental symptoms. The results were as follows. Alkali reserve varied between 46.2 and 70. In cases with no diarrhoea there was an increase in values of total calcium and ultra filtrable calcium (KORCHIG found lowered calcium in pellagrins with diarrhoea).

The acid-soluble phosphorus values (which are always higher than those of mineral phosphorus) showed wide variations 20 to 6 mgm. per 1000. On the average it was diminished. The ultrafiltrable phosphorus (mineral phosphorus) followed parallel to acid soluble phosphorus. The fraction which represents the difference between acid soluble phosphorus and mineral phosphorus is much reduced (50 per cent). Potassium varies greatly 3.48 to 145 mgm. per 1000 but on the whole is diminished. *H. S. STANBURY*

LEUTSKY (C. M.) Pellagra-like Lesions produced in Mice by Mineral Deficiencies.—*Lancet* 1937 Dec 18 pp 1421-1423 With 2 figs. [68 refs.]

After shortly referring to the many theories concerning pellagra and the contradictory opinions put forward in regard to the part played by vitamins the author gives reasons for believing that the cause of pellagra lies in an insufficiency of mineral components in food (cereals). It had previously been noted that albino mice fed upon a basal polenta diet to which 0.5 gm. of dried brewer's yeast was daily added developed a scaly condition of skin of the anterior half of the body and tail with necrosis of the ears and tail and loss of hair on the muzzle around the eyes and later on the anterior half of the body with inflamed conjunctiva.

It was later found that albino mice fed upon a diet casein 18 starch 68 oil 8 cod liver oil 2 and a salt mixture 1:1 the latter devised so as to correspond with the mineral content of maize developed the same symptoms followed by diarrhoea, sometimes with the passage of blood and ending fatally.

The salt mixture was poor in sodium calcium and chlorine but contained an excess of acid radicals as compared to what is known to be necessary for normal development. From this experiment the author argues that the symmetry of the affected parts of the body is a proof that the signs developing in these mice are due to the influence of the nervous system and that whilst the nervous system is acted upon it also acts itself on salt metabolism and concludes that the relationship of elements in our salt mixture affected the nervous and endocrine systems and was thus the principal cause of the illness. These signs disappeared as soon as a normal salt mixture was given. Thus there is a reason to seek the cause of pellagra in an insufficiency of mineral components in food (cereals).

*H. S. STANBURY*

ELLINGER (P) HASSAN (A) & TAHA (M M) Therapeutic Trials on Pellagrins in Egypt.—*Lancet* 1937 Nov 20 pp 1188-1190 With 1 fig [16 refs]

Aware of the fact that pellagrins may improve when merely hospitalized but otherwise untreated the authors sought to ascertain the effect of treatment by certain substances upon pellagrins when they remained in their ordinary surroundings taking their usual diet and doing their usual work in four villages in the central Nile delta

The number of cases treated was however so small that results must be inconclusive The results of treatment with egg white and dried whey were for other reasons inconclusive as also those following use of Fuller's earth adsorbate from autoclaved yeast extract an eluate from this and filtrate from the same plus lactoflavine There remain the cases treated with yeast these all responded to therapy and 9 out of 10 are stated to have been cured Elsewhere the statement is made A complete and lasting cure could not be expected as the treatment did not remove the cause of the disease [What symptoms the patients were suffering from and how so-called cure was evaluated are not mentioned.]  
H S Stannus

SMITH (David T) RUFFIN (Julian M) & SMITH (Susan Gower) Pellagra successfully treated with Nicotinic Acid a Case Report.—*Jl Amer Med Assoc* 1937 Dec 18 Vol 109 No 25 pp 2054-2055 With 2 figs.

*LANCET* 1937 Dec 18 p 1467 Nicotinic Acid and the Pellagra-Preventing (P.P.) Vitamin. (Report of an address by Dr Leslie HARRIS)

*BRITISH MEDICAL JOURNAL* 1937 Dec 18 p. 1243 Vitamin B and Nicotinic Acid. (Ditto)

Nicotinic acid was at one time supposed to be related to B<sub>1</sub> when FUNK and SUZUKI isolated this substance from active antineuritic concentrates a supposition later disproved Later EULER showed that nicotinic acid amide was a component of cozymase [with a formula nicotinic acid amide-ribose-O (P-O)-O (P-O)-O-ribose-adenine] More recently nicotinic acid or its amide has been shown to have a growth-promoting action for certain bacteria and certain experimental animals (R H MUELLER and others) MUELLER isolated nicotinic acid from the liver In 1937 C A ELVEHJEM *et alia* W J DANN L H MARGOLIS and others demonstrated the curative action of nicotinic acid or its amide in canine black tongue the condition originally suggested by GOLDBERGER as the equivalent of human pellagra It was given in doses of 1.5 mgm per kilo body weight and produced no ill effects when administered orally intramuscularly or intravenously

As is well known the original so-called vitamin B<sub>2</sub> has been shown to be a complex of several factors—lacto-flavin the rat-dermatitis factor called B<sub>6</sub> and a third unknown antipellagra factor It therefore now appears that nicotinic acid is closely related to the P.P. factor Experiments on monkeys in whom a disease analogous to pellagra can be produced demonstrated its curative effect

D T Smith and his colleagues now publish a case of pellagra successfully treated with nicotinic acid A white male aged 42 agriculturist He had suffered from recurrent symptoms of pellagra for 15 years On admission to hospital in Durham N Carolina, he

presented glossitis typical dermatitis of hands and feet diarrhoea and a mild intermittent dementia the orifices of the sebaceous glands over the entire face were plugged with horny sebaceous concretions. Apart from a moderate degree of anaemia—R.C. 4 100 000 Hb. 87 per cent. absent abdominal and cremasteric reflexes and a low upright T wave in the electrocardiogram there was nothing else to note. There was a history of a grossly deficient diet but no alcohol.

The patient was fed on a basic diet containing no natural P.P. factor. The sole treatment consisted in the administration of 60 mgm. nicotinic acid in sterile saline intramuscularly or the same dose in 1 000 cc 5 per cent dextrose in saline intravenously on alternate days to a total of 720 mgm. No untoward symptoms resulted, but flushing of the face chest neck and arms was noted a few minutes after the injections. Appetite improved in 24 hours, the mental confusion started to clear up in 48 hours, the skin after 3 days and was normal by the 12th day. On the 7th day the electrocardiogram was normal and on the 12th day the reflexes had reappeared.

Trials made in Egypt by Dr HASSAN under the direction of Dr Leslie Harris of the Cambridge Nutritional Laboratory were less dramatic. Nicotinic acid given by mouth up to a maximum level of  $\frac{1}{4}$  gm daily to two asylum cases and three prison cases was found to hasten the subsidence of the erythema in all cases and little else.

Harris suggests that nicotinic acid was not the sole major deficiency in some pellagra producing diets and that nicotinic acid may be only the precursor of a more active variation of the P.P. vitamin.

H S STARRUS.

PFTRI (Svend) WANSCHER (Oscar) TEGLEBJAERG (Else) & TEGLEBJAERG (H P Stubbe) Ueber die Behandlung der Pellagra mit Ventriculinpräparaten und die gastrogene Ätiologie des Leidens sowie seine Verwandtschaft mit Polyneuritis n 2. Treatment of Pellagra with Ventriculin. — *Acta Med Scandinavica* 1937 Vol 83. No 4-5 pp 450-488 [4 pages of refs]

This is a discussion of the aetiology of pellagra followed by a report on six cases of secondary pellagra in mental patients treated successfully with Ventriculin (Parke Davis & Co) in an institution in Copenhagen. The authors are inclined to discard the theory of avitaminosis and they consider pathological changes in the gastro-intestinal tract as the real cause of pellagra. Cases of secondary pellagra after gastrectomy with a clinical picture identical with primary pellagra have been described in literature and the authors agree with other workers that in these cases there is a lack of an intrinsic anti-pellagra factor which is normally present in the gastric mucous membrane. A similar condition would occur in cases of mesencephalic disease where hypothalamic centres regulating gastric function are affected. In these cases secondary pellagra seems to be quite common. In the reported cases treatment with vitamin B<sub>3</sub> preparations was unsuccessful while daily 30 gm doses of Ventriculin cured the most pronounced cases within two months.

H LORRY.

## MEDICAL AND SANITARY REPORTS

## CEYLON (1936)

Ceylon, an island in the Indian Ocean lying off the southerly extremity of India, has an area of 25 332 sq miles exclusive of the Jaffna lagoon the area of which is 149 sq miles. Colombo on the west coast, is the capital. Its greatest length is 270 miles from north to south and its greatest width is 140 miles. The total area is rather more than three-fourths that of Ireland.

*Vital Statistics*—The more important facts may be set out as follows—

Races and Communities	Estimated Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Ceylonese	4 858,800	166 755	33.6	110,077	22.2	27 449	165
Europeans (including officials)	10,200	124	12.2	71	7.0	4	32
Indians	662,200	25 181	37.9	12,891	19.4	4,336	172
All races	5,631,200	192,060	34.1	123 039	21.8	31 789	166

The North-Central and Eastern Provinces showed the highest birth and death rates. The Western and most populous of the nine Provinces again had the lowest birth death and infant mortality rates. For urban (36 principal towns) and rural areas the following facts are supplied—

Area	Estimated Population	Birth Rate	Death Rate	Rates per 1,000 live births	
				Maternal	Infant
<i>Urban areas</i>					
(a) Residents and non-residents	762,700	37.6	31.6	32.0	161
(b) Residents only	—	27.5	20.1	—	172
<i>Rural areas</i>	4 868,500	33.5	20.3	19.9	167

It is again noted (see this *Bulletin* 1937 Supp. pp 134\*–135\*) that in the rural areas registered causes of death cannot be regarded as dependable. In the 36 principal towns where the majority of deaths are medically certified, 24 127 deaths were registered: infant deaths accounted for 19.1 per cent. of the total; pneumonia for 12.8 per cent; malaria 8.8 per cent; and pulmonary tuberculosis 5.5 per cent. With regard to causes of death for the Island as a whole 11.8 per cent. of the total deaths appear under the title *pyrexia* (undefined).

The mean Indian population on Estates is given as 665 000; the birth-rate for these people 37.9; the death-rate 19.4 per 1 000 living; and the infant mortality rate 172 per 1 000 live births.

[April, 1933]

**Maternity and Child Welfare Work**—This continues to receive popular support but demands cannot adequately be met for want of a sufficient number of public health nurses. Though for the Island as a whole maternal mortality rates show a slight increase over 1935 experience in areas where intensive work on health unit lines is being done they show a decided reduction. Puerperal sepsis and puerperal convulsions accounted for 80.7 per cent of the 4159 deaths of women in childbirth. Of the 31789 infant deaths recorded 33.6 per cent were ascribed to convulsions and 21.3 per cent to debility. Trained midwives provided by Government numbered 141 by local authorities 128 and by estates 121 making a total of 389. It is said that about an equal number are engaged in private practice. During the year legislation relating to the control and practice of midwifery in specific areas was enacted.

The training of midwives continued to be carried out at the institutions mentioned in these pages a year ago. 158 women received training during the year under review. The period of training at the Lying-in Home has been increased to one year to be followed by six months of field work with a Health Unit. Also 9 nurses were selected and given training at the *Kalutara Totamune Health Unit*.

Among the *Indian population on Estates* the infant mortality rate was 172 with debility and convulsions the chief causes of death. The high rate is attributed to lack of skilled attention before, during, and after confinement. It is said that few estates employ trained midwives (see above) and that maternity wards in Estate hospitals are not much used.

At the *Infant Clinics* held at the *De Soysa Lying-in Home* 6739 women made 9902 visits and at the post-natal clinics 374 mothers paid 477 visits. In addition 4543 ante-natal and baby clinics were held at 77 centres where 17,393 visits were made by expectant mothers, 29,563 by infants, and 18,611 pre-school children were dealt with. Though the number of centres was fewer than in 1935 attendances were higher in all cases (see this Bulletin 1937 Supp. p. 135\*).

There are 48 voluntary associations in the Island actively associated with child welfare work with 27 local authorities contributing to the finances of these organizations. The four Lady Doctors continued their work chiefly among the Muslim population (see this Bulletin 1937 Supp. p. 135\*) during the year they made 4709 home visits, attended 203 mothers at childbirth, 1,235 sick expectant women, 1,897 sick infants and 6778 sick pre-school children. They also held 830 clinics at 14 centres.

**School Hygiene**—School health work continued to be carried out with the full available staff. During the year 2 Medical Officers and an additional trained school nurse were appointed, the total personnel engaged being 6 School Medical Officers, 27 Medical Officers, 21 District Medical Officers and 9 Nurses. The number of schools (excluding those unregistered or of special type) was 4625 and the school population 673,523. The sanitation of schools received close attention and the provision of adequate requirements more intensively pressed for. The total school population dealt with numbered 341,804 to 1,750 schools, 7,507 visits were made and 52,629 children were medically examined. Of the latter 38,483 or 70.5 per cent showed defects of one kind or another with an average of 1.9 defects per child. The principal findings recorded expressed as percentages of total defects:

included defects of teeth and gums (exclusive of dental caries 73 17.6 per cent, hookworm 15.6 malnutrition 10.3 anaemia 7.3 and pediculosis 7.3 (the majority were girls)

Other activities included anti-malarial work with half yearly examination of children parasite and spleen surveys administration of quinine etc. It is noted that during the course of a survey restricted to the examination of boys in selected schools throughout the Island 161,201 were examined and 30.6 per cent showed enlarged spleens. For hookworm 86,771 children were treated in 887 schools 2,854 school-children received anti-smallpox vaccination while 8,903 first and 6,969 second doses of T.A.B. were administered to school-children during the year.

Active interest continues to be maintained in *School Health Education* work. A special syllabus of lectures and demonstrations for the training of teachers in school health work was drafted. Increased progress is reported in the carrying out of routine health education procedures and instruction in schools. During the year 22 training classes (conducted by School Medical Officers and Medical Officers of Health) were held and 876 teachers trained.

*Public Health Sanitation etc.*—Dr S. T. GUNASEKERA was appointed Director of Medical and Sanitary Services with effect from October 1936 in succession to Dr R. BRIDGER. C.M.G. appointed Director of Medical Services Nigeria (see this *Bulletin* 1937 Supp. p. 145\*). Steady progress is reported. Malaria control and health work on health unit lines received special attention when these services are fully organized and functioning throughout the Island they should prove markedly effective in improving the health of the people. During the year several permanent anti-malarial works were constructed at various malaria campaign centres by the Division of Sanitary Engineering.

As regards *sewage disposal* the control of soil pollution through the construction maintenance and use of sanitary latrines is the chief work of Sanitary Assistants. During the year 22 public and 17,901 private latrines were constructed. Disposal of night-soil by trenching is carried out in 18 Urban District Council and 94 Sanitary Board towns. Refuse is disposed of by dumping trenching incineration and composting. Further attention to the provision of proper drainage schemes is desirable for the elimination of potential and actual breeding places of anophelines. The Division of Sanitary Engineering carried out a number of improvements during the year.

The question of *water supplies* received the special consideration of the authorities and every effort is being made to improve existing conditions. It is said that a large proportion of the population lacks an adequate and wholesome supply of drinking water. Soil surveys and borings were carried out by the Division of Sanitary Engineering with a view to the discovery of suitable well sites and schemes and estimates drafted in connexion with new proposals for water supplies in various areas. Work accomplished during the year included (a) the construction of 119 new public wells and the improvement of 1,667 (b) construction of a new impounding reservoir (c) preparation and replacement of certain chlorinator installations (d) preparation of designs etc. for purification works (see also this *Bulletin* 1937 Supp. p. 136\*).



*Food etc*—In Sanitary Board and Urban District areas all food-handling trades are licensed yearly after inspection and recommendation by Medical Officers of Health. Drafts of legislative measures relating to the control of milk supplies bakeries aerated water factories, etc are under consideration (see also this *Bulletin* 1937 Supp pp 136\*-137\*)

*Eleven Health Units* (see this *Bulletin* 1937 Supp p 137\*) were in operation in the Island and functioned satisfactorily throughout the year the additional personnel employed included 2 Medical Officers of Health, 27 Sanitary Inspectors 6 Public Health Nurses and 36 Midwives. The work was concerned with community and individual hygiene maternal and child welfare health surveys and health education school hygiene general sanitation. At 63 maternity and child welfare centres 3 713 clinics were held and large numbers of expectant mothers infants and pre-school children dealt with. In connexion with these intensive health activities the following facts may be noted —

Area Worked	Population	Birth Rate	Death Rate	I M R per 1 000 births	Maternal Mortality per 1 000 births
1,248 sq miles	820,166	29.1	15.3	121.8	12.1

*The training of Sanitary Inspectors* (now called Sanitary Assistants) was continued (see this *Bulletin* 1937 Supp. p. 138\*) and during the year out of a class of 40 35 sat for and 33 were successful at the examination of the Royal Sanitary Institute. It is noted that 13 Field Medical Officers and 13 Public Health Nurses received special training during the year.

*Sanitary conditions on Estates* were reported by inspecting Officers to have been satisfactory out of 459 estates visited only 9 were reported to have been in bad sanitary condition.

*Port Health Work* continues as previously described (see this *Bulletin* 1937 Supp p 137\*) Various new regulations under the Quarantine and Prevention of Diseases Ordinance 1897 were passed. During the year 2 615 steamers and 147 sailing vessels entered the port of Colombo 54 vessels arrived with cases of infectious diseases on board eight cases were removed to hospital, the remainder being isolated on the ships concerned. Thirty-nine cases of human plague were recorded in Colombo and the usual steps were taken to prevent the infection reaching shipping in the harbour regulations making compulsory the fumigation of cargoes from plague-infected ports were introduced. At 15 minor ports 530 steamers and 2,360 sailing vessels were dealt with.

Persons passing through the *Mandapam Quarantine Camp* numbered 86,855 and of these 72 passengers and 40 estate labourers were rejected on medical grounds 34 148 labourers were treated for ankylostomiasis, and 34 753 passengers and 39 607 labourers were vaccinated. At the *Talapara Quarantine Camp* 51 106 passengers were dealt with, 186 were rejected, and 52,820 were vaccinated.

*Hospitals Dispensaries etc*—All parts of the Island are generously provided by the State with hospitals and dispensaries as regards

hospitals the following details relate to accommodation and work accomplished at these institutions during the year under review —

Province	Number of Hospitals	Beds	Patients treated	Hospital Deaths
Western	24	5 408	86 981	6 996
Central	23	1 785	61 116	3 089
Southern	11	868	37,589	2,043
Northern	11	493	17 500	687
Eastern	6	404	8,288	452
N Western	9	862	31,491	2,104
N Central	3	200	8,368	514
Uva	12	700	22,839	968
Sabaramuwa	13	996	40 015	1 997
Totals	112	11 716	324 255	18 850*

\* In the Report total given as 18 990

In addition to the above general hospitals the *Prison Hospitals* with a total of 339 beds dealt with 5,385 in patients (26 died) and 72 731 out patients. The *Lunatic Asylum* treated 3 731 patients with 201 deaths and at the *House of Observation* (uncertified persons) 2 629 persons with 87 deaths. In the two *Leper Asylums* 1 115 patients received treatment and 70 died. Government maintains 674 central and branch *dispensaries* and visiting stations in addition to special institutions for the treatment of out patients e.g. tuberculosis eye diseases etc. At *dispensaries* and out patient departments 6 104 682 patients received treatment the principal diseases being *malaria* *gastro-intestinal diseases* *respiratory affections*. Private hospitals maintained on *Estates* numbered 85 and *dispensaries* 733.

The following facts relate to work carried out at selected institutions during the year —

*Hospitals etc in Colombo*  
*General Hospital* — In patients 29 757 deaths 3 180 out patients 103 644  
*Out-patient Clinic Diseases of Women* 1 020 new patients  
*X Ray Dept* 10 137 patients examined. *Ear Nose and Throat Dept* new out patients 9 079  
*Pathological Dept* examined and reported on 90 457 specimens  
*Dental Institute* — 26 513 new patients  
*Do-Soyas Lying in Home* — 9 199 in patients, 5 595 live births 171 maternal deaths  
*Chief training school for midwives*  
*Victoria Memorial Eye Hospital* — In patients 2,836 new out-patients 26 066 and 599 children dealt with at School Clinics.  
*Lady Haselock Hospital for Women and Lady Ridgeway Hospital for Children* — In patients 4 401 (women 1 637 children 2,764) deaths 742 (67 women 675 children) 54 pupils in the training school for nurses  
*Female V D Hospital* — In-patients 498 one death out patients 30 156  
*Infectious Diseases Hospital* — In patients 3 066 deaths 163.  
*Outstation Hospitals*  
*Handy Hospital* — Admissions 15,544 In the Nurses Training school 51 pupils  
*Eye Institute* 1 689 in-patients 11 786 out patients.  
*Galle Hospital* — In patients 12,088 deaths 758 Midwives trained 12.  
*Eye Institute* 11 340 cases

With regard to *buildings and building requirements* it is noted that a building programme for the next five years has been drawn up and

five building schemes itemized. The first stage of the new Nurses Home approaches completion the rebuilding of certain hospitals and the remodelling of others are among matters under consideration.

The following notes briefly summarize the principal items of morbidity experience etc. commented upon in the Report under review.

*Malaria* is still the most prevalent disease in the Island but though in some districts incidence was still high on the whole recovery from the disastrous epidemic of 1934-35 was satisfactory. The improvement is reflected in hospital returns where it is noted in patients treated numbered 73,192 as compared with 161,313 in the preceding year; hospital deaths due to malaria 2,030 as compared with 5,840 and out-patients treated at hospitals and dispensaries 2,873,436 as against 5,283,468. In the whole Island malaria deaths numbered 7,620 while under the title *pyrexia* 14,520 deaths were recorded. The distribution of types of infection among in-patients was *benign tertian* 61,077 *quartan* 3,036 *subtertian* 301 *cerebral malaria* 900 and *cockeria* 7,690; there were also 188 cases of *blackwater fever* with 6 deaths. Anti-malarial measures continued to be energetically carried out along the lines adopted in previous years (see this *Bulletin* 1935 Supp. p. 127\* 1936 Supp. p. 133\* and 1937 Supp. p. 140\*).

Of *plague* 57 cases with 46 deaths were recorded. 45 of the cases were bubonic and 12 septicaemic. [The figures on page 14 of the Report are not in agreement with those presented in Table IX on page 28.] Thirty-nine of the cases with 33 deaths occurred in Colombo and 14 with 9 deaths in two towns in the Central Province. Rat flea surveys continued to be carried out at Hatton in the Central Province. *X. cheopis* formed 91 per cent of the collection. Out of 759 rats examined at the Laboratory, 61 were positive with *P. pestis*.

Cases of *cholera* numbered 49 and there were 41 deaths due to this cause. 48 of the cases and 43 of the deaths occurred in the Batticaloa District of the Eastern Province. An investigation started in 1931 (but discontinued in 1934) to discover the number of persons harbouring cholera vibrios was reopened during the year. Vibrios isolated were sent to the Research Institute Kasauli for antigenic determination. Three fatal cases of *smallpox* were recorded. All occurred in Colombo among Tamils newly arrived from India. Primary vaccinations performed during the year totalled 145,108 of which 129,201 were successful.

*Diphtheria* appears to be on the increase and a study is being made of the incidence of the disease. During the year 103 cases with 13 deaths were reported to the Sanitary Branch, and 84 cases were treated in hospitals with 20 deaths. All cases were of the faucial variety and 77 per cent of them occurred in the Western Province. Deaths in the Island due to *influenza* numbered 1,583; there were 6,806 in-patient hospital cases, and out-patients treated for this cause totalled 177,669. *Measles* gave rise to 2,775 cases with 2 deaths; *mumps* 1,135 cases and 5 deaths, and *chickenpox* 6,768 cases with 12 deaths.

*Enteric fever* cases and deaths reported to the Sanitary branch of the Medical Department were 2,503 and 449 respectively, while hospital returns show that 3,048 in-patients were treated for the disease and 630 died. Of the hospital cases 2,320 were *Bact. typhosum* infections, 269 *Bact. paratyphosum A* and 99 *Bact. paratyphosum B*. Records of cases and deaths are unreliable for the majority of cases are said to escape notification (see this *Bulletin* 1937 Supp. p. 141\*). Of

dysentery 3 060 cases and 315 deaths were notified. Hospital patients numbered 5 179 and deaths 624. Among the hospital cases 3,333 were amoebic and 1 067 bacillary but since the distinction was often made on clinical grounds little value attaches to these figures it is noted that among cases subjected to complete laboratory investigation the bacillary type predominated. Out patients treated for the disease numbered 28 631.

For tuberculosis (all forms) 5,357 persons were treated as in patients at the various hospitals etc. and 1 177 died no less than 4 449 of the total cases and 1 054 of the deaths were due to the pulmonary form of the disease while deaths in the Island as a whole due to pulmonary tuberculosis numbered 3 167. At the four special institutions for tuberculosis (see this Bulletin 1937 Supp pp 141\*-142\*) 1 769 in patients and 3 640 out patients were dealt with. It is noted that hospital cases of pneumonia numbered 10 014 and deaths due to this cause 4 069 and cases of bronchitis 6,906 with 323 deaths.

The incidence of cancer appears steadily to increase. During the year under review 1 636 cases were dealt with in hospitals and 168 hospital deaths were ascribed to this cause. Cancer deaths in the Island as a whole numbered 580. Of the hospital cases 742 were Sinhalese and 96 died 271 were Tamils with 41 deaths the remainder occurring among members of other races. Cancer of the buccal cavity and female genital organs again predominated (see this Bulletin 1937 Supp p 141\*). Among other diseases responsible for hospital in patient treatment rheumatism with 4,284 cases and nephritis with 3 106 cases were prominent.

Leprosy.—During the year 1,253 cases were treated at Government hospitals and the two Leper Asylums and 74 patients died. The Leprosy Survey was completed in the Western Southern and Eastern Provinces the total area surveyed during the year amounted to about 1,800 square miles with a population of nearly half a million. Six new treatment centres were opened and there are now 16 clinics established for the early diagnosis and treatment of the disease at these centres 1,257 cases were under treatment or observation. It is stated that at the end of the year there were 2,207 known cases in the Island of which 1 910 were Ceylonese.

The work of the two Leper Asylums is separately described at some length. At the Hendala Leper Asylum 154 patients were admitted, 883 treated 62 discharged and 56 died while at the Manturu Leper Asylum 21 lepers were admitted 232 were treated 32 were discharged and 14 died. Treatment at these institutions followed along lines previously described (see this Bulletin 1937 Supp p 142\*).

Helminthic Diseases.—The Hookworm Campaign is reported to have made satisfactory progress during the year six additional dispensers were appointed to the staff. Administrative organization and procedure of the campaign remained for all practical purposes unchanged. The work continues to be described in great detail. During the year 1,855,572 treatments were given those carried out by the various agencies being—

At Government Institutions  
At Outside Institutions  
By Campaign Dispensers  
Health Units  
Mandapam Camp  
Estate Medical Staffs

1,223,850  
29,295  
424,522  
45,255  
34 148  
98,502

Cases treated as hospital in patients numbered 14 693 and of these 621 died. There were also 2 854 cases of *ascariasis* with 217 hospital deaths 103 cases of *filariasis* with 3 deaths and 267 out patient cases. At the Central Laboratory out of 18 013 faecal specimens examined 79 per cent contained *hookworm* 75 per cent. *trichuris* and 72 per cent. *ascaris*.

*Venereal Diseases*—In patients treated at the various hospitals numbered 7,382, distributed as to 2 258 cases of *syphilis* 4,856 of *gonococcal infections* 3 of *granuloma venereum* and 263 of *soft chancres* these titles in the aggregate were the cause of 90 hospital deaths. Out patients treated at hospitals and dispensaries totalled 28 072.

There are three special V D Clinics in Colombo and one in Kandy and at these centres the following cases were dealt with —

	Syphilis	Gonorrhoea	Other V D	Yaws
General Hospital, Colombo	1,289	1 531	89	10
Port Clinic for women Colombo	21	19	—	—
Female Branch Hospital, Colombo	227	367	369	—
Kandy Dispensary	97	122	42	8

Although only 18 cases of *yaws* appear to have been treated at the above four clinics 956 cases received treatment as hospital in-patients and 10 668 as dispensary out patients.

*Scientific*—The 32 168 specimens received and examined at the *Bacteriological Institute* included 11,870 samples of blood serum 2 112 of these reacted positively with the agglutinins of *Bact typhosum* 30 with *Bact paratyphosum* A and 48 with *Bact paratyphosum* B. Wassermann tests numbered 7,850 with positive reaction in 1,348 cases 436 out of 2 971 blood films examined were found to contain malaria parasites. Faecal specimens totalled 3 187 of which 218 contained *Bact dysenteriae* 375 the ova of intestinal parasites, and 10 *E histolytica*. On the other hand it is noted that among 1,922 faecal specimens received for examination from four institutions 178 contained *Bact dysenteriae* and 96 *E histolytica*.

The 79 687 doses of vaccines prepared and issued included 49,269 doses of T A B vaccines 17 872 doses of gonococcal vaccines 7 779 doses of plague and 3,586 doses of cholera vaccines.

Laboratory work is also carried out at two institutions in Colombo and at nine outstations specimens dealt with at these centres may be tabulated as follows —

	Specimens examined	Positive Malaria	Positive Hookworm
Victoria Memorial Eye Hospital, Colombo	7 43*	13	19
Lying-in Home, Colombo	7 012	174	107
9 Outstation Laboratories	123,237	6,001	*1,751

The investigation into the subject of diets and nutritional deficiencies of the local population started four years ago was completed (see this *Bulletin* 1937 Supp. p 144\*). The results of the work were published in the *Ceylon Journal of Science* Vol 4 Part 1 April 1936.

The new building for the Bacteriological Institute should be completed in 1937

At the Pasteur Institute 1 993 persons received preventive inoculation against rabies 938 of them being dealt with as in patients. Brains from dogs and other animals examined during the year numbered 583 of which 253 were positive with Negri bodies

*Division of Medical Entomology*—A comprehensive report describes in detail the work of this Division. Malaria research and control were the main preoccupations of the staff the work carried out at the 25 observation stations in the epidemic and 8 in the non-epidemic zone is described and results recorded. Upwards of 70 lectures and demonstrations on Medical Entomology with special reference to Ceylon conditions to Field Medical Officers Sanitary Inspectors etc were given

*Scientific Papers* published by members of the staff of the Department of Medical and Sanitary Services included the following—

- CHANDRAN (P K) Note on an unusual ophthalmic artery associated with other abnormalities—*Four Inst Lond* 1936 July Vol 70  
 ELLISON (F O B) Malaria epidemics and sunspot cycles—*Trans Roy Soc Trop Med Hyg Lond* Vol 29 No 6  
 HILL (W C O) Two examples of infantile malaria—*Ceylon Jour Sci* (D) 1936 Aug Vol 4 Pt 1  
 NICHOLLS (Lucius) A nutritional survey of the poorer classes in Ceylon—*Ibid*

HARUNARATNE (W A E.) (i) Carbon Tetrachloride Cirrhosis in relation to Liver regeneration (with G R CAMERON)—*Four Path Bact* 1936 Vol 42 No 1 (ii) The Pathology of Rhinopneumonitis—*Ibid*

PAUL (M A) Surgical measures in Leprosy—*Int Jour Leprosy* 1936 The following were published in the *Journal of the Ceylon Branch of the British Medical Association*—

- BLAZE (J R) Venereal Diseases in Ceylon  
 FERNANDO (P B) A note on the rectal administration of quinine  
 FERNANDO (S E) Notes on a case of Intraorbital Endothelioma  
 GUNAWARDENA (H C P) Tetanus  
 JAYASURIYA (J H F) A case of cerebral tumour  
 KUNARATNAM (I T) Notes on a case of Volvulus complicating Pregnancy  
 LEANAGE (D T J) The incidence of Syphilis  
 PAUL (Milroy) Notes on eleven cases of poisoning with Nachukai  
 POTTYAMBALAM (C) Neuro-fibromas of large nerves  
 SENANAYAKE (I A) Balantidial Dysentery  
 SIVAYATAMBI (G S) Treatment of enlarged prostate in the very aged  
 WICKREMASINGHE (S F) Observations regarding the uses of Atebrin and Quinine in the treatment of malaria  
 WIJERAMA (E M) Notes on two cases of interesting tropical diseases.

*Medical Education*—References to the 1936 Report of the Registrar of the Ceylon Medical College make mention of staff changes and appointments and to the students of various grades on the rolls of the College the relevant facts may be briefly summarized as follows—

Medical		Results of Examinations					
Sat	Passed	Apothecaries		Mid wives		Class I	
79	31	Sat	Passed	Sat	Passed	Sat	Passed
78	46	1st Apothecaries	25	15	Class I	41	32
51	37	2nd Apothecaries	53	24	Class II	117	101
53	28	Pharmacists	25	15			

*Concluding Observations Recommendations etc*—Dr S T Gunasekara outlines the policy of rapid expansion of future health work throughout the Island and emphasizes the importance of the training of necessary personnel if development on intensive lines is to be successfully undertaken in his opinion the Diploma in Public Health should be a *prerequisite* for all Field Medical Officers and facilities should be provided for such officers to obtain the qualification. The provision of adequate minor personnel is necessary to keep pace with developments envisaged. More radical measures for dealing with the plague problem in Colombo should be introduced. extensive rebuilding of properties in congested areas where plague is endemic and the establishment of an *Improvement Trust* are among the recommendations made. Further attention requires to be devoted to such matters as soil pollution provision of protected water supplies and the establishment of a training base in the field for malaria control work.

Once again mention is made of the overcrowding of hospitals the recommendations outlined in the 1935 Report are repeated (see this *Bulletin* 1937 Supp. p. 145\*).

*Financial*—Estimated expenditure on Medical and Sanitary Services for the year under review was Rs 10,681,422, while *actual expenditure* amounted to Rs 10,952,128. The latter sum, which represents 10.6 per cent of the Revenue of the Island during the financial year does not include the cost of new buildings or improvements to and maintenance of existing buildings.

*P. Granville Edge*

# TROPICAL DISEASES BULLETIN.

Vol. 35]

1938.

[No 5

## TRYPANOSOMIASIS

JACOPO (I) Ulteriore contributo alla proposta di una nuova  
classifica dei tripanosomi Further Contribution to the Proposed  
New Classification of the Trypanosomes. — *Ann di Med Nat e*  
Colon 1937 May-June 43rd Year Vol. 1 No 5-6 pp  
237-8 241-2 With 14 figs (2 coloured) on 3 plates

The author considering the peculiar large trypanosomes which occur  
in the blood of frogs proposes to limit the genus *Trypanosoma* Gruby  
1843 to these and similar forms and to place all other trypanosomes of  
the more conventional type in the genus *Castellanella* a name which was  
proposed for certain forms by Chalmers in 1918 This division fails  
to recognize the fact that the peculiar forms in the frog are really  
abnormal overgrowth forms which have remained over from an ordinary  
type of infection in the tadpole

C M Wenyon

CASTELLANI (A) & JACOPO (I) Ricerche sulla biologia della  
*Castellanella gambiense* in vitro Biology of *Trypanosoma*  
*gambiense* in vitro — *Riv di Parassit* Rome 1937 July  
Vol 1 No 3 pp 181-193 With 1 fig English summary  
(3 lines)

— & — Osservazioni su un caso di malattia del sonno  
[Observations on a Case of Sleeping Sickness. — *Ibid* pp 195-  
210 With 16 figs English summary (3 lines)

— & — Ricerche sperimentali sul polimorfismo della *Castella*  
*nella gambiense* [Polymorphism of *Trypanosoma gambiense* —  
*Ibid* pp 211-220 With 22 figs. (3 coloured) 12 refs.]  
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These papers three in number are based on a fatal case of sleeping  
sickness which occurred in an Italian who returned to Rome after  
residence in the Congo They appear to contain little that is new and,  
judging from the verbatim repetition in all three papers in this one  
number of the journal of a section including a diagram devoted to the  
classification of trypanosomes a section which is again reproduced  
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incorrect name for *Trypanosoma gambiense* which appears in the titles.



*Concluding Observations Recommendations etc.*—Dr S T Gnanasekara outlines the policy of rapid expansion of future health work throughout the Island and emphasizes the importance of the training of necessary personnel if development on intensive lines is to be successfully undertaken in his opinion the Diploma in Public Health should be a *passus non* for all Field Medical Officers and facilities should be provided for such officers to obtain the qualification. The provision of adequate minor personnel is necessary to keep pace with developments envisaged. More radical measures for dealing with the plague problem in Colombo should be introduced extensive rebuilding of properties in congested areas where plague is endemic and the establishment of an *Improvement Trust* are among the recommendations made. Further attention requires to be devoted to such matters as soil pollution provision of protected water supplies and the establishment of a training base in the field for malaria control work.

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[No. 5

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C M Wenyon

CASTELLANI (A) & JACOPO (I) Ricerche sulla biologia della *Castellanella gambiensis* in vitro [Biology of *Trypanosoma gambiense* in vitro]—*Riv di Parassit* Rome. 1937 July Vol. 1 No 3 pp 181-193 With 1 fig. English summary (3 lines)

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natives and increase of game has resulted since the removal of the natives into reserves. This is undesirable as the game may act as vectors in the dissemination of rinderpest and similar diseases.

IV 1

GOLD COAST COLONY REPORT ON THE DEPARTMENT OF ANIMAL HEALTH FOR THE YEAR 1936-37 [STEWART (J. L.) Director of Vet Services] [Trypanosomiasis pp 15-21]

It has been found that *T. simias* occurs in pigs in the forest and causes great and sudden mortality. A Syrian owner in Ashanti lost 150 pigs in a few weeks from this type of trypanosomiasis. Trypanosomes swarm in the blood and the pathological effect appears to be an acute septicaemia. The usual porcine trypanosomiasis is that caused by *T. brucei* which appears to have a predilection for pigs. Another interesting discovery was a number of cases where *T. theileri* were found in large numbers in the blood of cattle.

Therapeutic experiments with "Surfen C" were not successful with cattle but good results were claimed in canine trypanosomiasis. Over 50 laboratory cattle were treated by this drug and there were few cures and many relapses. The most effective drug is still tartar emetic. In *T. brucei* infections of horses and pigs nagonal was used, but in horses this drug caused swellings under the abdomen, ulcerated anus and a high temperature for about 4 days. The treatment however cured the 5 horses to which the drug was given.

A lengthy account is given of tsetse fly eradication work in the Pong Tamale and other areas.

IV 1

I. VAN HOOFF (L.) HEYWARD (C.) & PEEL (E.) Sur le rôle du porc indigène comme réservoir de *Trypanosoma gambiense* [The Native Pig as a Reservoir of *T. gambiense*]—*C. R. Soc. Biol.* 1937 Vol 128 No 24 pp 72-75

II. ——— & ——— Rôle du porc comme réservoir de *Trypanosoma gambiense* [The Pig as a Reservoir of *Trypanosoma gambiense*]—*Ibid.* pp 1245-1248

i. After referring briefly to the inconclusive results of the earlier attempts to infect pigs with *T. gambiense* the authors describe their own experiments. The pigs used were born and bred in Leopoldville, far from any focus of *Glossina*. Notwithstanding the improbability of a natural infection with *T. brucei* numerous blood examinations were made to exclude this. Four such pigs were infected with *T. gambiense*—two by blood inoculation and two by the bite of infected tsetse. All became infected, and from each *Glossina* were infected. In later experiments two laboratory-bred young pigs were used and these likewise were readily infected by the bites of infective tsetse.

The general conclusion reached is that the native pig is an ideal reservoir of *T. gambiense*. The parasite is scanty in the blood, it does not produce the slightest pathological reaction and it readily infects *Glossina*. The pig may remain for at least a year an active reservoir of *T. gambiense* and the parasite may acquire in it a complete resistance to trypanamide and morphological characters—numerous short forms and posterior nuclear forms—resembling those of *T. brucei* or *T. rhodesiense*.

ii. Here the authors continue their work to prove that the pig is a reservoir of *T. gambiense*. Glossina were fed on a patient infected with a trypanamide sensitive strain of *T. gambiense*. The strain was then passed by cyclical transmission through a series of three pigs and flies infected from the third pig were then fed on a human volunteer and on a fourth pig and two guinea-pigs. The fact that the man became infected shows that the pig can act as a reservoir of *T. gambiense* pathogenic to man. W. Y.

CURASSON (G.) Les trypanosomiasés virulentes du porc en Afrique. Observations personnelles sur celle à *T. brucei* en Afrique Occidentale française. Virulent Trypanosomiasis of the Pig in Africa. Personal Observations on that due to *T. brucei* in French West Africa.—*Rec Méd Vét Exot* 1937 July-Sept. Vol 10 No 3 pp 109-119. With 2 figs. [14 refs.]

After summarizing previous work on porcine trypanosomiasis Curasson passes to an account of his own observations. He states that he has seen numerous cases of natural infection of pigs especially in 1929 and 1934. In 1929 he encountered a very fatal epidemic in the region of Bamako. Of 800 animals more than 500 died of a chronic form of the disease with little in the way of signs beyond progressive emaciation. The blood contained a trypanosome indistinguishable from *T. brucei*—a diagnosis which was confirmed by MESVIL.

In 1934 there was another epidemic also in the vicinity of Bamako. When the author had to deal with it only 8 of 50 animals survived. In 4 days the 8 survivors had also perished. This infection was in contrast to the former extremely virulent, killing the pigs in 2 to 4 days. Trypanosomes in the blood were numerous and the parasite had the same morphological characters as that causing the 1929 epidemic. It was diagnosed as *T. brucei*. The trypanosome was subinoculated into the dog sheep rabbit guinea-pig rat *Cricetomys gambianus* *Grossarchus obscurus* and *Proceras* sp. In all it produced a rapidly fatal disease.

*T. brucei* infections in the pig may therefore be benign or severe. The cause of this variability is discussed and in the author's opinion, the increase in virulence may be due to successive reinfections and numerous passages through the pig. Possibly other factors like avitaminosis may also play an important part. The paper concludes with a brief discussion of the nomenclature of the pig trypanosomes and the conclusion reached is that they belong to two types *congolense* and *brucei*. W. Y.

HOARE (C. A.) On the Nomenclature of the Trypanosome causing Acute Porcine Trypanosomiasis in Africa.—*Bull Soc. Path Exot* 1937 Oct. 13 Vol 30 No 8. pp 686-692. [18 refs.]

This paper is devoted to a discussion of the correct name of the trypanosome causing acute porcine trypanosomiasis in Africa. The issue lies between the names *T. suis* Ochmann 1905 *T. simiae* Bruce *et al* 1912, and *T. porci* Schwetx 1932.

The history and status of these names are considered in chronological order and the conclusion is reached that the correct and only valid name for the polymorphic trypanosome causing acute trypanosomiasis in African pigs is *T. simiae* Bruce *et al* 1912. This name has

priority over *T. porci* Schwetz, 1932, in accordance with Article 27 of the International Code of Zoological Nomenclature. The name *T. suis* is not valid, as it does not comply with the requirements set down in Article 25. The synonymy of the trypanosome is as follows —

*T. suis* Bruce *et al.* 1912.

Synonyms *T. ignotum* Kinghorn *et* Yorke 1912

*Duttonella suis* (Chalmers 1918)

*T. rodhaini* Walravens, 1924

*T. porci* Schwetz, 1932.

*T. congolensis porci* Schwetz 1934

<sup>2</sup> [*T. suis* Ochmann 1905]

II 1

SLATINEANU (A) BALMUS (G) & BALMUS (P) Sur une épidémie due au trypanosome *Lewis* Kent [An Epidémie due to *T. lewisi*] — *Arch Roumaines Path Expériment et Microbiol* Parh. 1937 June, Vol. 10 No 2 pp 159-170 With 8 coloured figs. on plates. [16 refs.]

A severe epidemic arose spontaneously amongst the anthrax stock rats during last winter. The multiplication of rats suddenly stopped and most of the young rats failed to increase in weight. The animals suddenly lost their activity. Some of them became somnolent and stopped feeding. They had diarrhoea, the coat was staring, there was no fever but pronounced dyspnoea.

After about a week or ten days a second phase of the disease set in. This was characterized by a blepharo-conjunctivitis, and sometimes by a haemorrhagic lesion at the tip of the nose which often became gangrenous. The animal became very dyspnoeic, emaciated and cold. The feet were pale, oedematous and often exhibited small haemorrhages. Many of the animals died.

Investigations show that this epidemic was due to *T. lewisi*. The general conclusion is drawn that, under certain conditions unfavourable to the rat, this trypanosome can produce severe and fatal epidemics.

W 1

NASH (T. A. M.) Advice on Tsetse Surveys and Clearings. Revised Edition 1937 July 9 pp Kaduna Govt Printer

In his introduction the author states that this revised edition of his pamphlet has become necessary in order to embrace the results of recent research and a more extensive knowledge of conditions in the Northern Provinces of Nigeria. The object of the paper is to simplify the subject by making generalizations that will be universally applicable, but this is not easy in a country the size of Nigeria with a vegetation ranging from mangrove swamp to desert scrub. Nash hopes however that the general principles laid down will prove helpful as a working basis.

The paper is written in simple language for the benefit of the layman. A brief description is given of the general appearances of the commonest Nigerian species viz *G. morsitans*, *G. tachinoides* and *G. palpalis*; this is followed by some remarks on a tsetse survey and by an account of the haunts of the three species.

Nash then passes to the subject of clearings. He points out that these are of two kinds viz aggressive and defensive. A tsetse survey

in the late dry season often shows that tsetse which have been menacing settlements during the rains are dependent for their existence upon a distant dry season concentration area. The removal of this fly sanctuary may stop the wet season spread into the settlements but such aggressive clearing should not be attempted by the layman as it requires expert judgment.

Defensive clearing aims at protecting the population from attack by tsetse during the course of their normal work or whilst travelling along the trade routes. It aims at reducing man fly contact to negligible proportions by removing the riverine vegetation which enables tsetse to penetrate the areas frequented by man. No attempt is made to exterminate the fly. It is merely driven back to a safe distance. The matter is discussed in respect of each of the three species of tsetse mentioned above and the paper ends with some notes on the correct method of clearing riverine vegetation. II 1

STEWART (J. L.) Eradication of Tsetse-Flies of the *G. palpalis* Group from the Pong-Tamale Area, Northern Territories, Gold Coast. No 1 of 1937. 18 pp. With 1 map [13 refs.] 1937. Accra. Govt. Printer & London. Crown Agents for the Colonies. 4 Millbank S.W.1 [1s.]

This article must be consulted in the original by those interested. It contains a description of a successful aggressive anti tsetse clearing scheme to eliminate fly from a defined area. The flora and methods of clearing are fully described and the bionomics of the *G. palpalis* group are discussed. IV 1

CORSON (J. F.) A Second Note on the Infectivity to Man of a Strain of *Trypanosoma rhodesiense*. Resistance of Two African Volunteers to Infection.—*Jl Trop Med & Hyg* 1937 Nov 1 Vol. 40 No 21 pp 263-266

In previous papers the results are given of experiments which were made on man with a strain of *T. rhodesiense* which had been maintained for a considerable period in sheep and antelopes [this *Bulletin* 1937 Vol. 34 p 831].

The present paper describes further experiments on four African volunteers in connexion with the transmission of this strain through two more antelopes viz an impala and a bushbuck in succession.

The author gives the following summary of his experiments —

Two experiments were made in each of which a single *G. morsitans* infected with *T. rhodesiense* failed to produce infection in one volunteer and afterwards infected another.

The infections produced by the bites of these flies in control animals gave no indication that the general virulence of the strain of *T. rhodesiense* had become less during maintenance for nearly three years in ruminant animals and *G. morsitans*.

The infections in white rats, which were bitten by these two flies before and after the dates on which the volunteers were bitten, were similar and indicated no change in the virulence of the trypanosomes in either of the flies during their infective life. It seems to be clear therefore that volunteers Masungwi and Bundala were more resistant than the other two and this suggests that in nature many persons are bitten by infective flies without becoming infected. If that is so it seems also to be probable that cases of mapparent infection such as that described by Lamborn

and Howatt (1936) may not be of rare occurrence, and that some infected people may recover spontaneously. It was shown long ago, in experiments with *T. brucei* and *T. gambiense* that even such susceptible animals as white rats, guinea pigs, and monkeys may resist infection, and sometimes spontaneous recovery occurs. In experiments with single *G. morsitans* infected with *T. rhodesiense* I have not yet found that any of the ordinary susceptible laboratory animals has failed to become infected after being bitten, nor has there been any case of spontaneous recovery among them, but, as virulence is relative to the animal, it is very probable, by analogy with *T. brucei* and *T. gambiense* and with the recovery of antelopes from infection with *T. rhodesiense* that in man also spontaneous recovery may take place. It would be interesting if similar experiments with a suitable strain of trypanosomes were made on volunteers in Europe to see whether like African natives, some are resistant. In such experiments I think that the question of apparent infections has to be considered. Duke (loc cit.) recorded the case of a volunteer whose blood showed no trypanosomes until the fifty-first day after his first inoculation of infected blood and the eighteenth day after the second yet his blood was infective to a monkey twenty days after his first inoculation. It is possible also that the action of Bayer 205 on the kidneys should be considered, as it varies in different persons, but the drug has now been used in thousands of cases and the action on the kidneys seems to be temporary only.

W Y

REICHENOW (Eduard) *Daerikultur pathogener Trypanosomen* [The Culture of Pathogenic Trypanosomes.]—Reprinted from C. R. VIIIe Congrès Internat. Zool. Lisbonne 1935 pp 1955-1968 13 reis]

The work recorded in this paper has already been published elsewhere and noticed in this Bulletin [vide 1930 Vol 27 p 244 and 1935 Vol 32, p 34] W Y

VAN HOOFF (L.) HEMERARD (C.) & PEEL (E.) *Influence de repas préliminaires indifférents sur l'évolution de Trypanosoma cazalbour chez Glossina palpalis*. [Influence of a Preliminary Uninfected Meal on the Evolution of Trypanosoma cazalbour in Glossina palpalis]—C. R. Soc. Biol. 1937 Vol 128 No 34 pp. 1249-1252

In a previous paper (this Bulletin 1937 Vol 34 p 928) the authors have shown that a preliminary meal on normal animals decreases the infectibility of *G. palpalis* when it is subsequently fed on an animal infected with *T. gambiense*. This trypanosome undergoes a long and complicated evolution in the body of the insect. At first it multiplies actively in the lumen of the intestine but it seems that it can usually escape the expulsive force of the digestive flux if it is able to invade the extraperitrophic space.

It may be that several normal meals taken before the infected feed may cause chemical changes preventing the flagellates obtaining foothold in the extraperitrophic space, or possibly the first meal made by a tsetse coincides with the final development of the peritrophic membrane and with the filling of the extraperitrophic space by digestive fluid. If this be the case it would seem that the tsetse is more likely to become infected if its first meal is on infected blood.

The evolution of *T. trux* in *Glossina* is not so complicated and the present paper is concerned with ascertaining whether preliminary meals on normal blood have any influence on the capacity of tsetse to become infected with this trypanosome if subsequently fed on infected animals.

The experiments show that preliminary meals on normal blood did not modify the infectibility of *G. palpalis* with *T. trux*. Comparing these results with those obtained with *T. gambiense* the authors see an argument against the hypothesis that *T. gambiense* at once installs itself within the salivary passages of *G. palpalis*—*vide* the hypothesis of SCHILLING *this Bulletin* 1937 Vol. 34 p. 125. H. Y.

VA. HOOFF (L.), HEYRARD (C.) & PEEL (E.) Action de repas médicamenteux sur l'évolution des trypanosomes pathogènes chez la *Glossina palpalis*. The Effect of a Drug Meal in the Evolution of Pathogenic Trypanosomes in *G. palpalis*.—*Ann. Soc. Bdege de Méd. Trop.* 1937 Sept. 30 Vol. 17 No. 3 pp. 385-440 [19 refs.]

The authors inquire whether the presence of a drug in the blood ingested by a tsetse can destroy the trypanosomes in the fly or whether such a meal has any action on the trypanosomes at any stage of their development in the fly. Many investigators have attempted to solve these problems and a brief summary of their results is given.

The present experiments are divided into two groups viz. those performed with tryparsamide and those in which Bayer 205 was used. Attempts were first made to disinfect isolated infective *Glossina* by feeding them on guinea-pigs a few hours after they had been given a dose of tryparsamide. The next set of experiments was devised with the object of ascertaining whether a preliminary feed on tryparsamide blood had any action on the development of *T. gambiense* in the tsetse. In this work the flies were fed on a guinea-pig which had, a few hours previously, been given a dose of tryparsamide and then on an infecting animal. The number of flies which became infected was compared with the number becoming infected in control experiments in which the flies were given a preliminary meal on a normal guinea-pig instead of on one which had had tryparsamide. In the third set of experiments a meal of tryparsamide blood was given whilst the trypanosomes were developing in the tsetse fly in order to ascertain whether the drug exerted any influence on the evolution of the parasites in the fly. In each of the three sets of experiments observations were made on normal and arsenic-resistant strains of *T. gambiense*.

The experiments in which Bayer 205 was used were of a similar nature except that only normal strains of *T. gambiense* were used. The paper concludes with a record of similar experiments with trypanosomes pathogenic to domestic stock viz. *T. brucei*, *T. congolense* and *T. casalis*.

The general conclusions of this interesting and painstaking work are as follows—

1. A meal on blood containing tryparsamide or Bayer 205 does not destroy *T. gambiense* infecting the intestine, proventriculus and salivary glands of *Glossina*. Even the salivary gland trypanosomes found in the proboscis of infective *Glossina* do not appear to be affected. A limited experiment suggests that the same is true for neosalvarsan and the antimonial Sdt. 411 Bayer.



2 Nevertheless, an important proportion of tsetse thus treated, although they harbour trypanosomes in the salivary glands and appear to be infective are no longer able to transmit the infection to guinea-pigs.

3 The prolongation of the incubation period in guinea-pigs, bitten by tsetse treated in this manner confirms the view that the drug had changed the virulence of the trypanosomes even though it had failed to produce morphological changes.

4 The preliminary meal on trypanamide or Germanin blood did not influence the evolution of *T. gambiense* in the tsetse unless the drug was present in very large amounts. Such preliminary meals of drug containing blood did not cause the trypanosomes to become drug resistant.

5 A preliminary feed on trypanamide blood had no inhibitory effect on the development of trypanamide resistant trypanosomes in the tsetse, even though the dose of the drug given to the guinea-pig was appropriately large in relation to the degree of resistance of the trypanosome.

6 The disinfecting meals given to tsetse during the course of the developmental cycle of the trypanosomes gave results similar to those given with isolated infective flies. They did not lessen the frequency of the infections, but they inhibited or delayed transmission of the infection to guinea-pigs.

Analogous results were obtained with *T. brucei*, *T. congolense* appeared to escape entirely the action of a drug meal. *T. calabarisi* however responded definitely to the influence of a Germanin meal, which decreased notably the frequency of infections.

IV 1

VAN HOOFF (L.) HENRARD (C.) & PHEL (E.) L'infection proventriculaire permet-elle de pronostiquer à coup sûr l'invasion ultérieure des glandes salivaires de *Glossina palpalis* par *Trypanosoma gambiense*? [Does Proventricular Infection imply Ultimate Invasion of the Salivary Glands of *G. palpalis* by *T. gambiense*?]—*Ann. Soc. Belges de Méd. Trop.* 1937 Sept 30 Vol 17 No 3 pp. 441-459 With 1 chart [12 refs]

This paper deals with a subject which has recently been fully discussed by MORGATROYD and YORKE in an article which had apparently not come to the notice of van Hooft and his colleagues [this *Bulletin* 1937 Vol 34 p 533]. After referring to the differences of opinion between TAYLOR (1932) and DUKE (1933) on the subject of the significance of proventricular invasion, they quote the reviewer (1936) who stated that he had found that proventricular infection did not necessarily imply subsequent gland infection and that he believed loss of transmissibility occurred in three stages viz—firstly the trypanosome lost the capacity to pass from the proventriculus to the salivary glands then it lost the capacity to spread forwards in the extraperitrophic space to the proventriculus and lastly it lost the capacity of establishing itself in the extraperitrophic space. In the present paper van Hooft and his colleagues bring forward certain facts which support this view.

It is difficult to do justice to this paper in a summary of moderate length and it should be consulted in the original by those interested. The authors deal with three strains of *T. gambiense* the first was non-transmissible, the second feebly transmissible, and the third easily transmissible by *G. palpalis*. Full details are given in a series of tables of the results of dissection of the flies which were fed on each of these strains and which survived more than a few days after the infective meal. Of the 1428 flies fed on the non transmissible strain, dissection

showed 40 intestinal and 8 proventricular infections among the 1,390 flies fed on the feebly transmissible strain there were 20 intestinal 31 proventricular and 3 gland infections and among the 245 flies fed on the easily transmissible strain there were 30 intestine 10 proventricular and 7 gland infections

The authors reach the general conclusion that proventricular infection does not necessarily imply ultimate invasion of the salivary glands and does not give any certain indication of the cyclical transmissibility of a strain. It marks however a particular stage in the developmental cycle of the trypanosome because it allows of the recognition of special long thin forms which apparently are destined to invade the salivary glands.

The infection of the proventriculus by these special forms confirms the belief that the normal infection of *Glossina* by *T. gambiense* is by the indirect route and dependent upon a preliminary development in the intestine [vide this Bulletin 1937 Vol. 34 p 125] W I

LEWIS (E Aneurin) Tsetse-Flies in the Ol Orokuti Area of the Masai Reserve Kenya Colony—*Bull Entom Res* 1937 Oct Vol 28 Pt. 3 pp 395-402. With 1 fig (map) [12 refs.]

A description is given of the fly belts in the Ol Orokuti area of the Masai Reserve. The paper seems to be of local interest and must be consulted in the original by those interested W I

BAX (S Napier) The Senses of Smell and Sight in *Glossina swynnertoni*—*Bull Entom Res* 1937 Dec. Vol 28 Pt. 4 pp 539-582. With 18 figs. & 2 plates

*Glossina swynnertoni* is attracted by the scent of oxen up to about 180 feet and by sight of moving oxen up to 450 feet.

In the experiments on scent perception tsetse flies were placed in a cage (77 × 22 × 26 inches) covered with mosquito netting standing about two feet from the ground in an enclosure of grass screens while a team of six oxen with two men was driven past the enclosure at varying distances up wind. The movements of the flies were observed during the passage of the oxen and in control periods before and after. Increased activity indicating perception of the scent was observed at ranges of 110-180 feet for male flies but failed at 300 ft. Female flies reacted only up to 110 ft. wind was blowing at 1½ to 5½ miles per hour in these experiments. There was no response to shouting or the trampling of oxen or to scent of manure human etc. though the exhaust of a lorry at 300 ft. was attractive to the flies.

In the experiments on vision a gap was cut in the circumference of the enclosure and the oxen were passed by to leeward. The maximum degree of contrast was ensured by using black oxen against a light background in bright sunshine. Positive results (increased activity on the part of the flies) were obtained up to a range of 450 ft. with male flies there was no reaction at 600 ft. The responses were diminished when the contrast was less as when the sun was obscured or the background in semi-shadow. A small dark screen at 110 ft. gave as good reactions as the span of oxen.

These observations bear out the conclusion that both sight and scent are important in the behaviour of tsetse flies—the relative importance of these senses doubtless differs from one species to another

I. B. Wigglesworth

JACK (Rupert W.) & WILLIAMS (W. L.) The Effect of Temperature on the Reaction of *Glossina morsitans* Westw. to Light. A Preliminary Note.—*Bull. Entom. Res.* 1937 Oct. Vol. 28. Pt. 3. pp 499–503 With 3 figs.

In the course of recent work certain facts of considerable interest concerning the phototropic reactions of *Glossina morsitans* have been established. The reaction to light of active flies of this species at normal indoor temperatures is positive. MELLANBY (1936) had also found the same in respect of *G. palpalis*.

In their present experiments, the authors have shown that if the temperature is raised sufficiently the reaction of the flies is reversed and becomes strongly negative.

The apparatus used in these experiments is described in detail. It consists essentially of an insulated cage divided by a removable partition into two approximately equal sections. The top and end of one section are glazed and the other walls painted white. The second compartment is dark and the walls blackened. The source of light used in the tests was a 100-watt electric bulb above the glass roof of the light compartment a water screen being interposed to intercept the heat rays.

The flies showed no negative reaction to this light at temperatures below 30°C but by raising the temperature to the requisite height in the light section every fly could be driven into the dark section, where it would remain. A fly which has once exhibited the negative reaction will usually return promptly to the dark section if driven out, provided that the temperature does not fall. The negative reaction occurred whether the temperature in the dark section was below equal to or above that of the light section. It was even found that flies would leave an uncomfortably high but not immediately fatal, temperature in the light section (42°C) for a rapidly fatal temperature in the dark section (48°C) dropping dead very shortly after entering the latter. The reaction is therefore definitely negative to light itself and is independent of the relative temperature in the light and dark.

The negative reaction to light is also exhibited at high temperatures by *Stomoxys calcitrans*, but not so strongly as by tsetse. The common Rhodesian house-fly *Musca vicina* displays a far greater ability to find a more comfortable temperature by the process of trial and error independently of the light conditions although, even in this species, strong light may assist the search.

Under natural conditions the temperature in the shade is, of course always lower than in the sun, and the reaction described above is obviously the guiding impulse by which the fly is rapidly translated, when necessary from the dangerous heat of the sun's rays to the cooler refuge of the shade.

The authors discuss this reaction in relation to the movements of *G. morsitans* in the forest, in the interior of dense patches of evergreen forest along river banks and during the heat of the day in the savannah forest. They reach the conclusion that the distribution of tsetse flies

in relation to the vegetation and other features of their habitat at any given time may be explicable to a large extent on the basis of phototropic reactions.

W I

CORSON (J F) The Use of Isolated Infective Flies in Transmission Experiments with *Glossina morsitans* and *Trypanosoma rhodesiense* — *Jl Trop Med & Hyg* 1937 Oct 15 Vol. 40 No 20 pp 248-249

This article which must be consulted in the original by those interested, states the various disadvantages resulting from the use of boxes of flies in experiments on the transmission of trypanosomes by *Glossina*. In Corson's opinion much is to be said for employing isolated flies in work of this sort.

W I

TANGANYIKA TERRITORY ANNUAL MEDICAL AND SANITARY REPORT YEAR ENDED 31ST DECEMBER 1936 [SCOTT (R. R.) Director of Med. Services] [Trypanosomiasis p 114]

A native child of about fourteen years of age was admitted to hospital suffering from ascites and enlarged glands in the neck. *T. rhodesiense* was found in the blood. Appropriate treatment was given but the child died from intercurrent disease two months later.

An unusual feature of the case was the discovery of enormous numbers of trypanosomes in the ascitic fluid. A single drop of the fluid was found to swarm with them. The fluid contained large numbers of cells of the lymphoid or mononuclear type. Large mulberry cells were also found which the author believed to resemble the morular cells of MOTT.

W I

MENK (W) & BOCK (E) Zur Klinik und Behandlung der afrikanischen Schlafkrankheit. Kurzer Bericht ueber 4 Fälle. [The Clinical History and Treatment of Four Cases of African Trypanosomiasis.] — *Arch f Schiffs u Trop Hyg* 1937 Dec. Vol. 41 No 12 pp 751-754

These four cases are recorded because they indicate the necessity of most careful examination for evidence of trypanosomiasis in patients returning from sleeping sickness areas even though they may not exhibit any of the classical signs of disease.

One of the patients who at first had symptoms suggestive of a latent infection with trypanosomes was found also to be suffering from diabetes mellitus filariasis tertian malaria and ankylostomiasis. It is interesting to note that control of the diabetes by insulin was in no way interfered with by intensive germanin and atabrin treatment. The treatment of the trypanosomiasis by germanin appeared to provoke the latent tertian malaria.

The *Microfilaria diurna* in the blood were uninfluenced by germanin and atabrin. The complications in no way interfered with the action of germanin on the trypanosome infection.

W I

OKLOVITCH Sur les résultats de l'action préventive du Bayer 205 ou moranyl dans une région à forte endémie de maladie du sommeil. [The Prophylactic Action of Bayer 205 or Moranyl, in a Heavily Endemic Sleeping Sickness Region.—*Ann Soc Belg de Med Trop* 1937 Sept 30 Vol 17 No 3 pp 353-359 With 1 graph]

This paper describes a large scale experiment to ascertain the prophylactic value of moranyl. The district chosen was a limited region bounded on the east by the Boma Lukula railway and on the west by the Lukunga river which is a tributary of the Congo. The total population comprised 621 persons. In this district the disease has always maintained the upper hand in spite of all efforts to master it. Families were to be found consisting of 10-15 individuals, not a single one of whom had escaped the disease. A certain equilibrium appeared to have been reached prior to 1934 when the number of cases seemed to increase and at the end of that year 20 new cases (7.8 per cent. of the population) were found, but probably the actual number of cases was double this. In view of this the control measures were tightened up but a census in August 1935 showed 15 new cases for the first 7 months of the year. As in November 1935 seven new cases were discovered, it was decided to moranize all those who had enlarged glands whether positive or negative. These which numbered 75 were treated as follows—

- 29 adults each received 3 gm. of moranyl in a week
- 40 children received 1 to 1.25 gm. in a week
- 6 infants received 0.45 to 0.60 gm. in a week

No accident attended this dosage except that some cases exhibited transient albuminuria which disappeared in 8 days.

As however a further examination of the population in January 1936 revealed 7 new cases it was decided to moranize the entire population consisting of 160 men, 280 women, and 201 children. After having made 88 gland punctures with 7 positive results, 93 blood centrifugalizations with 1 positive result and 32 thick blood film examinations, moranization was commenced as follows—

- Adults received 1 gm. of moranyl intravenously
- Children received 0.4 to 0.75 gm. of moranyl intravenously
- Infants received 0.15 to 0.3 gm. intramuscularly

The only untoward results were occasional febrile disturbances with rigors and headaches lasting up to 2 hours.

Three months later 44 gland punctures were made and 72 blood centrifugalizations and 29 thick blood films were examined without a single positive result. The moranization was then repeated. After still another 3 months the population was again examined with negative results and a third dose of moranyl given. The last examination made 3 months after the third dose of the drug, has failed to reveal a single case of the infection amongst those treated but 4 natives who for one reason or another were not treated had become infected. W. Y.

MURGATROYD (Frederick) Observations on the Therapeutic Action of Three Arsenicals, Neoceryl, K. 324 and K. 352, in Gambian Sleeping Sickness.—*Ann Trop Med & Parasit.* 1937 Dec. 21 Vol 31 No. 4 pp 473-512 [12 refs.]

The author has tested the therapeutic value of neoceryl [this Bulletin 1936 Vol 33 p. 639] and of two other arsenicals prepared

for the Chemotherapy Committee of the Medical Research Council vi- K 324 and K 352 [thus *Bulletin* 1935 Vol 32 p 699] on sleeping sickness cases in the Gambia. In all 122 cases were treated with neocryl 44 of these had normal cerebrospinal fluids and 78 pathological fluids. As a routine 10 doses of 0.045 gm per kgm body weight were given at weekly intervals but many of the patients attended irregularly and in a few cases higher doses up to 0.06 gm per kgm. body weight were given. The results of treating these cases are summarized in tables.

Neocryl produced a rapid and definite clinical improvement in practically every case treated although some of the patients were in a very advanced stage of the disease. A considerable number of patients felt so well after a few doses that they absconded. Of the early cases with normal spinal fluids 30 finished a course of treatment all were clinically improved two experienced visual disturbances from which complete recovery was made and one relapsed 16 weeks after finishing treatment.

In the cases with pathological spinal fluids 46 finished a course of treatment and of these 35 were clinically improved and their spinal fluids changed towards normality. One case failed to improve clinically and in three others trypanosomes failed to disappear from the spinal fluid although the general condition was improved. In 4 cases there was clinical improvement and parasites disappeared from the spinal fluid but neither the protein nor the cell count was improved. Three patients receiving routine doses suffered from toxic effects which were attributed to the drug one having an attack of vomiting and abdominal pain and two experiencing transient disturbances of vision which in one case was very slight. Another patient after a large dose had gastro-intestinal symptoms another had a short attack of dizziness which could not be definitely associated with the drug and still another suffered loss of vision which was probably due to the disease rather than to the drug. Four patients relapsed during the period of observation which varied from patient to patient but in some instances was over 4 months.

Murgatroyd writes that these results resemble those which would have been expected from tryparsamide and probably the two drugs are very similar in their actions. It is however impossible to draw any accurate comparison until the later fate of cases treated with neocryl is known. Arrangements have been made with various medical officers in the Gambia to continue the observation of patients where possible.

The clinical tests with K 324 and K 352 gave unsatisfactory results. They were found to be toxic for man in relatively small doses and all doses up to the maximum tolerated were ineffective in the therapy of human cerebral trypanosomiasis. H Y

ACRES (Ian S) *The Treatment of Sleeping Sickness with Neocryl.*—  
*Trans Roy Soc Trop Med & Hyg* 1937 Nov 30 Vol 31  
 No 3 pp 333-338

The author has tested the therapeutic action of neocryl on cases of sleeping sickness at the Baptist Mission Hospital at Bolobo in the Belgian Congo. The following summary is given —

1. A series of twenty-one cases of sleeping sickness were treated with neocryl with dosage similar to that of trypanarsyl, the Belgian equivalent of

trypanamide three cases previously unresponsive to arsenical compounds were similarly treated

" 2 In first stage cases there was definite clinical improvement, and the immediate results as determined by gland and lumbar puncture were satisfactory

" 3. In second stage cases despite marked clinical improvement, the immediate results were not so satisfactory. The result of the treatment in these cases seems uncertain, in view of the rapid relapse of Cases C2 and C4 and the trypanosomes persistent in the blood of Case C8. In reference to this last case it is worthy of note that in the blood of some cases treated with trypanarsyl in our district trypanosomes can be found even after a full course of the drug

" 4 In cases previously treated by arsenical compounds the results were not encouraging

" 5 No advantage was found in giving injections twice weekly although the number of cases treated thus does not perhaps permit a fair comparison

6 No definite toxic reaction was noted, except in cases previously treated with trypanarsyl. A dose of 3 grammes twice weekly was given without untoward effect in a normally developed man

7 It is impossible to compare the result of treatment with neocryl with that of trypanarsyl (trypanamide) until the cases reported have been followed up for at least 2 years, but the evidence submitted in the addendum suggests that it is definitely inferior to trypanarsyl.

In an addendum, the author states, after his paper was sent for publication it became evident that there were many relapses. Accordingly he re-examined all the test cases before six months had elapsed after their courses of treatment. Of 9 first-stage cases 2 had to be taken under treatment again because of raised cell count in the cerebrospinal fluid. Of 12 second-stage cases, 7 or 8 have relapsed and have been treated again. The author remarks that the 2 first stage cases which relapsed were those treated by two injections weekly. This is a remarkably high relapse rate and the symptoms in most cases have returned.

Acres considers that on the whole neocryl is apparently a somewhat dangerous drug to use in sleeping sickness as it gives rather rapid clinical improvement which, however is only temporary, in second stage cases. The danger is in the treatment of cases who cannot adequately be followed up and who disappear before the end of treatment

W J

LOURIE (E. M.) & YORKE (Warrington) Studies in Chemotherapy  
XVI. The Trypanocidal Action of Synthalin.—*Ann Trop Med  
& Parasit.* 1937 Oct. 22. Vol. 31 No 3 pp. 435-445  
[47 refs.]

The authors give the following summary of their work —

1 Attention is drawn to the recent interesting observation of the Jancsó and of Schern and Artagaveytia Allende that synthalin exerts a curative action on mice infected with various pathogenic trypanosomes

" 2 It is pointed out that the considerations which led these two groups of workers independently to make this discovery were apparently the same viz that trypanosomes require for their metabolism a large quantity of sugar and that synthalin when given in large doses produces a pronounced hypoglycaemia. A summary of the literature bearing on these matters is given

3 Reference is made to the fact that both Jancsó and Schern, as the result of a detailed consideration of the manner in which synthalin exerts its therapeutic action in experimental trypanosomiasis, reach the

conclusion that it is mainly due to the fact that the drug produces a hypoglycaemia both workers, however recognize the possibility that a direct action of the drug on the parasite may play a subsidiary rôle in the therapeutic process.

4 Our experiments on the therapeutic action of synthalin on mice infected with various pathogenic trypanosomes confirm those of Jancsó and of Schern. A single large dose (0.075 mgm per 20 gm. mouse) produced a definite therapeutic effect on mice infected with *T. equiperdum* and on mice infected with the normal, the atoxyl resistant and the Bayer resistant strains of *T. rhodesiense*. With repeated doses of the drug it was found possible to cure a certain proportion of infected animals.

5 In order to throw light on the problem whether the therapeutic action of synthalin is due to a direct toxic action on the trypanosomes or whether it is an indirect effect resulting from a hypoglycaemia we have examined the trypanocidal action of the drug on suspensions of trypanosomes *in vitro* by means of the technique described in previous papers of this series.

It was found that synthalin (and synthalin B) exerts *in vitro* a powerfully trypanocidal action which is of the same order as that of the aromatic trivalent arsenicals: a concentration of only 1 : 262,000,000 sufficing to destroy practically all the trypanosomes in the suspensions within 24 hours. It was also found that synthalin is just as active *in vitro* for the atoxyl and Bayer resistant strains as for the normal strain.

The trypanocidal action of insulin *in vitro* is relatively negligible.

These observations seem to warrant the conclusion that the therapeutic action of synthalin depends upon a direct lethal effect of the drug on the parasite.

6 This demonstration of the powerfully trypanocidal action of synthalin has encouraged a search for similar or allied compounds of equal trypanocidal activity and of less toxicity for the host. The results obtained with a considerable series of such substances prepared by Dr. H. King will be published in the near future. IV Y

KING (H), LOURIE (E. M.) & YORKE (Warrington). New Trypanocidal Substances.—*Lancet* 1937 Dec. 11 pp 1360-1363

This investigation was prompted by the discovery (*vide* above) that synthalin has a direct trypanocidal action. A considerable number of guanidines, isothioureas, amidines and amines with alkyl and alkylene chains were prepared and their trypanocidal activity *in vitro*, their toxicity for mice and their therapeutic action on infected mice examined.

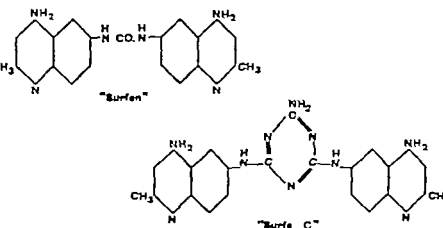
It was found that some of these compounds, notably certain members of the diamidines, exhibited a powerful trypanocidal action *in vitro*. With the most active member of the series, undecane 1 : 11 diamidine, it was possible to produce permanent cures in infected laboratory animals. As undecane diamidine is of entirely different chemical constitution from all known trypanocidal substances, the discovery is of considerable academic interest. It is also of practical significance in that it opens up a new field in the search for substances of therapeutic value against trypanosomal infections. IV Y

LENSCH (H). Neue Chemotherapeutika der 4-Amino-chinolin Reihe [New Chemotherapeutical Drugs of the 4-Aminoquinoline Series] —*Angewandte Chemie* 1937 Nov. 27 Vol. 50 No. 48. pp 891-895

This paper records the results of an unusual method of conducting a chemotherapeutical investigation *viz.* the development of drugs



from a starting-point 4-aminoquinoline selected on purely academic grounds. Out of the large number of derivatives made two bis-2-methyl-4-aminoquinolyl-6-carbamide and bis-2-methyl-4-aminoquinolyl-6-melamine to which the names "Surfen" and "Surfen C" have been given, were considered to be worth clinical trial.



"Surfen" has been recently introduced as a non staining antiseptic which is claimed to be more active in living tissues than *in vitro*. "Surfen C" has been the subject of a number of references in this *Bulletin* (1935 Vol 32, p. 688 1936 Vol 33, pp 169 170 173 175 1937 Vol 34 pp. 103, 117 119 521 554). *T. congolense* infections in horses and cattle hitherto almost uninfected by drugs have been treated by it with encouraging results, in the Sudan (Vol 34 p. 119) Uganda (Vol 33 p. 175) and Tanganyika (Vol 33 p. 170) but in Nigeria with less success (Vol 33 p. 169). In *T. brucei* infections in cattle which are extremely resistant to treatment it has given good results (Vol 33, p. 175). Use of this drug in human trypanosomiasis is contra-indicated by the production of acute nephritis (Vol 32, p. 686 Vol 33 p. 169). A third substance related to these two in which the two amino-methylquinoline nuclei are joined by a diallylmalonate group is stated to possess activity against *Trypanosoma cruzi* which has not been affected hitherto by any chemotherapeutic agent. This has not been given a trivial name.

W. H. Gray

BROWNING (C. H.) MORGAN (G. T.) ROBB (J. V. M.) & WALLS (L. P.)

The Trypanocidal Action of Certain Phenanthridinium Compounds.

—*Jl Path & Bact* 1933. Jan. Vol 46 No. 1 pp. 203-204

Two of a series of phenanthridine and phenanthridinium compounds possess curative action in mice experimentally infected with trypanosomes. These are —

A 7-amino-9-(p-aminophenyl)-10-methyl phenanthridinium chloride ( $\text{NH}_2$  groups at positions 7 and 9)

B 3-(acetyl-amino)-9-(p-acetylammophenyl)-10-methyl phenanthridinium chloride ( $\text{NHCOCH}_3$  groups at positions 3 and 9)

Both of these compounds in doses approaching the maximum tolerated (one subcutaneous injection of 1 mgm. of A, or 2.5-5.0 mgm.

of B for a mouse of 20 gm) are curative for mice infected with *T. brucei* when administered 24 hours after inoculation. Compound A has likewise a curative action on *T. congolense* infections in mice whilst Compound B which is without effect on this trypanosome has a marked therapeutic action on *Sp. minus* in mice although the largest doses do not lead to cure. Both compounds act on a strain of *T. brucei* which is completely resistant to the largest tolerated doses of arsacetin.

These phenanthridinium compounds constitute a new type of trypanocidal agent

IV ]

STRANGWAYS (Winifred I) The Trypanocidal Activity *in vitro* of Aromatic Thioarsinites and Neo-Arsphenamine.—*Ann Trop Med & Parasit* 1937 Oct 22 Vol 31 No 3 pp 387-404 [17 refs.]

Reference is made to the work of the reviewer and his colleagues which showed that whereas pentavalent arsenic acids had very little trypanocidal activity *in vitro* all compounds containing trivalent arsenic whether arsenoxides thioarsinites or arseno-compounds were lethal to trypanosomes at very high dilutions.

A series of stable chemical compounds formed by the condensation of aromatic arsenoxides with sulphhydryl compounds were prepared by KING. It was found that in nearly all cases these compounds were less toxic to the hosts than their content of arsenoxide would lead one to expect while in many cases a substance with a high therapeutic index was produced by the condensation with sulphhydryl compound of an oxide with a low therapeutic index.

Miss Strangeways considered that an investigation of the trypanocidal activity *in vitro* of compounds of this type might throw some light on the exact form in which they exert their lethal effect. It might be supposed either (1) that they act without chemical change in structure or (2) that they must first undergo hydrolytic fission with the production of the intensely active arsenoxide.

The methods used for this study were also applied to neoarsphenamine which also might be supposed to exert its curative action either (1) in the unchanged condition or (2) after oxidation to the active arsenoxide.

The technique employed was that employed by YORKE ADAMS and MURGATROYD (1929) and details of the experiments are given in detail.

The conclusions reached are as follows —

Thioarsinites have a toxicity for trypanosomes *in vitro* in high dilution. That this toxicity is due to the hydrolysis of the compound in aqueous solution with liberation of the highly trypanocidal arsenoxide is shown by

1. The identity in the lethal activity of equimolecular concentrations of thioarsinite and its parent oxide.

2. The inhibition of the lethal action both of an arsenoxide and a thioarsinite in strong solution by the addition of 10 molecules excess of glutathione and the failure to obtain protection in higher dilutions owing to the preponderating influence of water molecules.

Now thioarsinites have been shown to be more effective as therapeutic agents in experimental trypanosomiasis than the corresponding arsenoxides (Cohen King and Strangeways *Jl Chem Soc* 1931 p 3043). Since as is shown above the directly trypanocidal agent of a thioarsinite is the arsenoxide this requires some explanation.

"Thioarsenites are readily obtained in solution as neutral sodium salts. At the relatively high concentrations (1 in 1 000 to 1 in 100) in which the solutions are introduced into the blood-stream, there is very little hydrolysis to the arsenoxide and sulphhydryl components, as shown by a negligible nitroprusside reaction. After intravenous injection and consequent dilution of thioarsenite there will be some hydrolysis with liberation of free arsenoxide. This partial hydrolysis is rapid, since the trypanosome begins to disappear from the blood-stream within half an hour after injection, but it is not immediately complete, since as has been pointed out above the dose of a thioarsenite which can be tolerated is greater than would be expected from the calculated content of arsenoxide."

"Neocarphenamine has a trypanocidal action *in vitro* in low concentrations although these are higher than those found for arsenoxides and thioarsenites. This toxicity is not increased by aerial oxidation during the course of an experiment. The addition of 10 molecules excess glutathione to strong solutions of neocarphenamine inhibits its lethal action, although a similar excess is without effect on the toxicity of his dilutions. This lends support to the suggestion that neocarphenamine is adsorbed by the trypanosome and becomes oxidized, within the trypanosome or on its surface, to the highly trypanocidal arsenoxide. The inhibitory action of glutathione would, then, be the same as in the case of arsenoxides and thioarsenites."

II 1

STRANGEWAYS (Winifred I.) Observations on the Trypanocidal Action *in vitro* of Solutions of Glutathione and Ascorbic Acid. *Ann Trop Med & Parasit* 1937 Oct 22 Vol 31 No 3. pp 405-416 With 1 chart 11 refs.

The investigation recorded in this paper was the result of a phenomenon observed in the author's previous work. It was found that different concentrations of glutathione in Tyrode solutions containing an equal volume of heated serum, or in Tyrode alone, exerted a definite lethal action on suspensions of trypanosomes. Death of the trypanosomes in such a medium did not occur earlier in the highest or the lowest concentration of glutathione but in an intermediate zone of concentrations. When on the other hand fresh unheated serum was used for the medium, the trypanosomes usually remained healthy in all but the highest concentrations of glutathione.

As a result of her analysis of this phenomenon, Miss Strangeways considers that she has obtained a certain amount of evidence in support of the hypothesis that the formation of hydrogen peroxide during the oxidation of solutions of glutathione and ascorbic acid is responsible for their trypanocidal activity. The exact mechanism of this formation is, however, not apparent. It might be supposed (1) that the hydrogen peroxide is formed by aerial oxidation, either immediately or on standing of solutions of the two compounds, or (2) that the oxidation takes place as a result of the metabolic processes of the trypanosomes themselves. These alternative hypotheses are considered at some length.

The author summarizes her work by stating that in neutral or slightly alkaline solutions of glutathione and ascorbic acid exposed to air a substance is rapidly formed which is very toxic for trypanosomes *in vitro*. Evidence has been produced for the identity of this substance with hydrogen peroxide.

II 1

RADVA (R.) Etude sur le problème de la trypanosomiase chimio-résistante Nouvelle méthode de traitement [On the Problem of Drug-Resistance in Trypanosomiasis].—*Ann Soc Belge de Méd Trop* 1937 Sept 30 Vol 17 No 3 pp 361-374

Drug-resistance is a very real danger not only to the patient himself but also owing to the difficulties which it creates in attempts to deal with a focus of trypanosomiasis. The only way to deal satisfactorily with such a patient is to remove him to a place which is not infested with *Glossina*. This however is not easily done because certain resistant cases may escape observation and because the patients object to isolation.

After these preliminary observations the author passes to a description of his own investigations. He first decided to examine whether the trypanosomes from an arsenic resistant case behave differently from those from a normal case when tested *in vitro* against an arsenical drug. Resistant cases are defined as those who were refractory to a course of 15 injections of trypanarsyl followed by emetic or trystibine. The trypanosomes were obtained by triple centrifugation of the patient's blood. A drop of the deposit rich in trypanosomes was added to a drop of 1:200 trypanarsyl, and the mixture (hanging drop preparations) kept at 37°C. All the parasites—normal and resistant alike—disappeared in an hour. From this the author concludes that the resistant parasites were *in vitro* just as chemo-sensitive as were the normal parasites. [This sort of work is open to very severe criticism. No controls appear to have been used. Would the parasites have lived under the conditions of the experiment in the absence of trypanarsyl? This drug is a most unfortunate one for the purpose in question—it is well known that the pentavalent arsenicals are practically inactive whereas the trivalent compounds kill the normal trypanosomes when present in only 1 in 100 millions. The reviewer and his colleagues have proved beyond all doubt that resistant strains of trypanosomes exhibit great resistance *in vitro*.]

The next part of the paper deals with agglutinins. The sera of 11 normal untreated cases contained practically no agglutinins but after treatment they exhibited considerable agglutinating and lytic power. The sera of the resistant cases exerted no agglutinating or lytic action after treatment. From these observations the author conceived the idea of giving his resistant cases a combined treatment consisting of a transfusion of blood from the convalescent normal patients and a dose of trypanarsyl. He claims that whilst neither of these measures alone did any good the combination of convalescent serum and drug produced sterilization. IV 1

FRENCH (M. H.) Changes in the Sedimentation Rates of the Red Blood Corpuscles during Trypanosome Infections.—*Jl Comp Path & Therap* 1937 Sept. Vol. 50 Pt 3 pp 191-194

In the course of nutritional and biochemical studies on trypanosomiasis in the larger farm animals the opportunity was taken of studying the sedimentation rates of the red cells. It was found that there was a big difference in the sedimentation rates of normal healthy cattle and sheep blood when compared with donkey's blood. Increased sedimentation rates follow infection with *T. congolense* and *T. brucei* but the increase is small in cattle slightly greater in sheep and very much more marked in donkey's blood. IV Y

PACKCHAXIAN (Ardzroony) The Electrical Conductivity of Blood and Serum in Acute *Trypanosoma brucei* Infection.—*Jl. Comp Path & Therap* 1937 Sept. Vol. 50 Pt. 3 pp 195-200. With 1 fig [16 refs.]

This work was undertaken in order to ascertain whether any marked change exists in the electrical conductivity of the serum or blood of nagana rats during the progress of the disease in comparison with normal rats

It was found that there was a distinct difference in conductivity in the case of normal and nagana defibrinated rat blood that of the infected blood being definitely higher than that of the normal blood. Normal and nagana rat serum exhibited no difference in conductivity. The conductivity of normal and nagana serum is always higher than that of serum which contains blood cells or *T. brucei*. The lower conductivity of the cells is apparently due to their physico-chemical structure and the relative impermeability of the cell wall to the ions.

II 1

SHANKROCKS (Horace F) The Action of Specific Immune Serum and of Normal Human Serum on Infections of *Trypanosoma hippicum* Darling in the Rat.—*Univ California Public Zool* 1937 Vol. 41 No. 18, pp 235-243. [17 refs.]

The following summary is given —

1 An improved method of separating trypanosomes from the blood constituents of the host is described. The technic calls for a potent hemolytic serum specific for all the blood cells of the host which is used for agglutination of the mass of the blood cells, followed by hemolysis of the remaining constituents

2 The isolated trypanosomes were used as antigen in the production of two specific antitrypanosome sera. The production of one serum was stimulated by injecting rabbits with living trypanosomes the other with organisms killed by 0.5 per cent phenol

3 Titres of both trypanolytic sera were virtually identical with regard to the strain used in immunization when tested *in vitro* (agglutination and lysis) and *in vivo* (protection)

4 The serum produced against living trypanosomes was of a more polyvalent nature (i.e. it was antagonistic to more strains) than the phenolized antigen serum when tested *in vitro* against several heterologous strains of the same species

5 Protection experiments showed that the survival time of treated protected rats, contrary to the conclusions of Tahaferro and Johnson (1928) and Johnson (1929) was in direct proportion to the amount of protective immune serum administered

6 Experiments showed that with periods of 72 and 144 hours elapsing between two doses of the same pooled sera, a crisis was induced after the second injection of serum. This seems to indicate that the trypanosomes were not completely resistant to the action of this serum even though they had survived former contact with it. This is in contrast to the results of Franke (1905) and many later investigators, who have reported that when trypanosomes once resist the action of a serum, they are resistant for numerous generations to further action of that same serum.

7 Pooled normal human serum was titrated under the same condition as the immune sera referred to above and showed partial destruction of the trypanosomes at a dilution of only 1/64. *In vivo* however 1.0- and 2.0-cc. doses gave complete protection to rats whose controls died in nine days. Laveran and Mesnil (1912) and other early workers believed the definite *in vivo* action of normal human serum could

not be demonstrated *in vitro* Yorke Adams and Murgatroyd (1929) state that there is a direct action of the human serum on a suspension of the organisms *in vitro*. Several workers since then have shown that the direct action of the human serum does not protect even man himself from infection by a strain susceptible to the same human serum *in vitro*. The present work, by comparing specific immune sera of high titre with normal human serum of low *in vitro* titre confirms the recent view that there is a slight *in vitro* action of human serum on the organisms yet shows this is not responsible for the complete protection afforded rats when normal human serum is administered

II }

VAN DEN BRANDEN & POTTIER (R.) Le controle biologique des glyphenarsines (trypanamide tryponarsyl novatoxyl trypothan) [The Biological Control of the Glyphenarsines (Trypanamide Tryponarsyl, Novatoxyl and Trypothan).]—*Bull Soc Path Exot* 1933. Jan 12. Vol 31 No 1 pp 46-52.

The authors point out that hitherto all tests on the toxicity of the glyphenarsines have been carried out successfully on rabbits. Recently however they have substituted the white rat. Their technique is as follows—

Five white rats preferably males (if not, non-gravid females) weight 100-150 gm. and free from all visible blemishes are given 1.5 gm of the drug per kilo of body weight. This dose is dissolved in 10 times its weight of distilled sterile water and the solution is injected into the caudal vein. It is laid down that during the 6 following days not more than 2 rats should succumb and the remainder should exhibit all the appearances of good health.

Thirty two comparative tests were made on rabbits and white rats simultaneously and of these 30 gave concordant results. The authors conclude therefore that for glyphenarsine toxicity tests the rabbit can be replaced by the white rat.

In order to render the biological control of the glyphenarsines still more severe the authors have practised the toxicity tests on rabbits infected with *T. brucei* when the infection has become chronic thus approaching as closely as possible the conditions met with when man is treated with trypanamide. The maximum duration of *T. brucei* infection in rabbits is 58 days and in order to prolong the infection beyond this period small doses of foudrin were given from time to time. By this means 18 rabbits were kept alive during a period of 5 months. Glyphenarsine toxicity tests on such chronically infected animals revealed no differences from those performed on normal animals. The general conclusions reached were that if the glyphenarsines submitted to these tests produce visual troubles in abnormal numbers or other ill effects the cause must be attributed to the state of the patient (intercurrent infections exhaustion etc.) or to faults of technique

II }

WITTEBOLLE (P) Sur valeur thérapeutique et prophylactique de Dn 18 (tryxibine) dans l'infection du cobaye par une souche arséno-résistante de *Trypanosoma gambiense*. [On the Therapeutic and Prophylactic Value of Dn 18 on an Arsenic-Resistant Strain of *T. gambiense* in the Guinea pig.]—*Rev Belg Sci Méd* 1937 June-July Vol 9 No 6 pp 389-390

In this note the author records observations on the toxicity and therapeutic value of a trivalent antimonial preparation prepared by

MEURICE under the name "Trystibine" The drug had apparently a rapid effect on the peripheral circulation parasites disappearing from the blood of guinea-pigs within about ten minutes after the administration of a dose of 2 cgm. per kilo but the cure was not permanent as relapses occurred

The general conclusion is that Trystibane (Dn 18) has no prophylactic or permanent therapeutic value for guinea-pigs infected with *T. gambiense* II 1

LALNOY (L) & PRIEUR (Marie) Etude de l'action trypanocide comparée sur *Tr. brucei*, *Tr. congolense*, *Tr. annamense* normal et *Tr. annamense* chimiorésistant de quelques composés organiques d'antimoine (Comparison of the Trypanocidal Activity of Seven Organic Antimonial Compounds on *T. brucei*, *T. congolense* and *T. annamense* (Normal and Resistant Strains))—*Bull Soc Path Exot.* 1937 Dec 8 Vol 30 No 10 pp 869-871

A table is given showing the therapeutic activity of four antimonial compounds on mice infected with *T. brucei* and the normal strain of *T. annamense* respectively Of the four compounds amino-phenyl-stibinate of methylglucamine proved to be the best This compound acted equally well on both infections producing cures in one-fifth of the toxic dose

The second part of the work consisted in comparing the action of aminophenylstibinate of methylglucamine on *T. congolense* and on an arsenic resistant (and therefore antimony resistant) strain of *T. annamense* It was found that the naturally resistant *T. congolense* and the artificially resistant *T. annamense* responded about equally II 1

LAGODSKY (H.) Toxicité et activité trypanocide (*Tr. brucei*) du chlorure de rhodium, chez la souris (Toxicity and Trypanocidal Activity of Chloride of Rhodium in Mice infected with *T. brucei*)—*Bull Soc Path Exot.* 1938 Jan 12 Vol 31 No 1 pp 44-48

The conclusion reached from this work is that chloride of rhodium is of no therapeutic value in *T. brucei* infections of mice II 1

PERLA (DAVID) The Effect of an Excess of Vitamin C on the Natural Resistance of Mice and Guinea Pigs to Trypanosome Infections.—*Amer J Hyg.* 1937 Sept Vol 28 No 2 pp 374-381 24 refs<sup>1</sup>

After summarizing the work of previous investigators showing that the moderate excess of ascorbic acid may raise the natural resistance of guinea-pigs to diphtheria toxin the author describes his own experiments on the effect of excess of Vitamin C on *T. equiperdum* infections in mice and guinea-pigs.

Mice were given 1 mgm. per day of ascorbic acid for 14 days prior to the injection of trypanosomes and thereafter during the course of the infection. This experiment was repeated three times, and each experiment comprised 20 test mice and the same number of control mice No modification of the infection was observed in any of the experiments.

In another series of experiments the effect of repeated injections of ascorbic acid on *T. brucei* infection in guinea-pigs was studied. The ascorbic acid was injected intraperitoneally in a dose of 10 mgm. daily. The injections were given during a period of 42 days prior to the infection and thereafter to the death of the animal.

In the first experiment 12 guinea-pigs were treated in this way with ascorbic acid and 12 were used as controls. Of the treated animals only two became infected and died within 25 and 30 days. All the controls succumbed.

In the second experiment the same daily dose of Vitamin C was given during a period of 77 days prior to injection of *T. brucei*. Of the 7 guinea-pigs treated with ascorbic acid all succumbed to infection within 11 to 27 days, whilst of the 7 controls 2 failed to become infected. The author concludes from this that the continued injection of 10 mgm. of Vitamin C over a long period may be deleterious and toxic and may lower the resistance of the host.

In a third experiment 10 guinea-pigs were given the daily dose of 10 mgm. of ascorbic acid for 42 days prior to the injection of trypanosomes. All these animals became infected. The average duration of life being 76.3 days, all of the 10 controls also became infected the average duration of life being 56.1 days.

The author summarizes his work as follows—

An excess of vitamin C administered for a period of 2 weeks prior to infection and throughout its course had no influence on the natural resistance of mice to *Trypanosoma equiperdum* infection.

A moderate excess of vitamin C administered for a period of 6 weeks prior to infection and throughout its course raised the natural resistance to *Trypanosoma brucei* infection in guinea-pigs of known stock in which the dietary content of vitamin C had been rigidly controlled. These animals either developed abortive infections, or if a fatal one supervened lived considerably longer than control animals. This result however was not consistently obtained for when ascorbic acid was administered in the same daily quantities for a longer period of time prior to the injection of the trypanosomes a favourable effect on the course of the disease was not observed.

B I

TALICE (R V) Nouveaux foyers de la maladie de Chagas. Premiers cas signalés en Uruguay. [New Foci of Chagas Disease. The First Cases discovered in Uruguay].—*Bull. Soc. Path. Exot.* 1937 Dec 8 Vol. 30 No. 10 pp. 865-869

*Triatoma* have been known to exist in Uruguay since 1933 and it was shown in 1921 by GAMINARA that *Triatoma infestans* and *T. rubrovaria* were infected with *Trypanosoma cruzi*. Talice has found that these two species constituted 99 per cent. of the *Triatoma* of this region. Their habits differ markedly. *T. rubrovaria* is not a domestic insect; it lives on rocky hillocks and feeds on the blood of wild animals and exceptionally on that of man. *T. infestans* is however strictly domestic; it is never found far from human habitations and feeds on man and his domestic animals. Up to the commencement of this year an infected vertebrate animal had not been found. Encouraged by the success of the Argentine workers and being convinced that *T. infestans* must play the most important part in the dissemination of the trypanosome the author commenced a study of this bug and searched carefully for

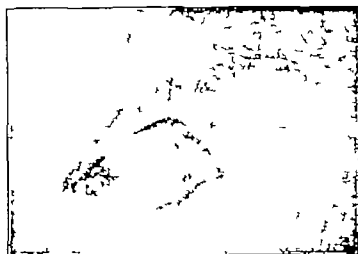


cases of human infection in the department of Paysandú, where *T. infestans* is very prevalent. His work was rewarded by the discovery of 4 cases of the disease viz., a girl aged 8, a man of 20, a girl of 12, and a child of 4. Clinical details of these cases are given. W. Y.

TALICE (R. V.) RIAL (Benito) VOLONTERIO (Mario) & OSIMANI (Juan J.) Segundo caso uruguayo de enfermedad de Chagas (forma aguda) [Another Acute Case of Chagas Disease in Uruguay]—Reprinted from *Archivos Uruguayos de Med. Ciruj. y Especialidades* 1937 Nov Vol. 11 No. 5 pp. 493-506 With 4 figs. & 1 chart [11 refs.]

This is the second case of Chagas disease in an acute form to be recorded in Uruguay. The first was diagnosed in the same town, Paysandú, by Talice, DE MEDINA and Rial in April, 1937.

The patient whose case is described here was a girl of 12 years who lived in Buracayupí and came to the Paysandú hospital for treatment and was admitted. *Triatoma infestans* abounded in the patient's home. The course was typical and the patient left hospital ten weeks later. The dacryo-adenitis was very distinct (see illustration). The blood showed little change in the erythrocyte count but the leucocytes a month after admission were 4,600 per cmm. with 52.5 per cent. lymphocytes sixteen days later 10,700 of which 62.1 per cent. were lymphocytes and a fortnight later (10 days before the patient left hospital) 19,300 with 58 per cent. lymphocytes. Her serum gave a positive W. R. at the first examination [no record is found of later tests] though there were no other indications of syphilis and the mother's blood gave a negative W. R. The authors wonder whether Chagas disease may cause this reaction.



Left eye of patient with Chagas Disease showing dacryo-adenitis  
(The patient is looking towards her nose)

[Reproduced from the *Archivos Uruguayos de Medicina, Cirugía y Especialidades*.]

MAZZA (Salvador) BASSO (Germinal) & BASSO (Redento) Investigaciones sobre la enfermedad de Chagas I Primer caso mortal de forma aguda de enfermedad de Chagas comprobado en Mendoza. [First Fatal Case of Acute Chagas' Disease in Mendoza.] —Universidad Buenos Aires Misión de Estudios de Patología Regional Argentina Jujuy 1937 Publicación No 33 pp 1 32 With 30 figs

The patient was a girl of 12 years living in Guaymallén in which district all her life had been spent. The first sign of her illness was on 24th April 1936 when she had oedema and itching of the lids of the right eye by the 29th the oedema had occluded the eye and spread to the cheek and temporal region. The skin over it was of a violet red colour the submaxillary and cervical glands of the same side were enlarged but not the preauricular 17 days after the onset. The liver extended from the 5th interspace to two fingers breadths below the costal margin and the spleen three. Five or more trypanosomes could be found in each thick drop of blood. The cardiac area was normal pulse regular 99 per minute. There seemed to be slight increase in the size of the thyroid. On 20th May vomiting occurred two days later the pulse rate was 120 with marked hypotension red cells 3,980,000 white 6,400 Hb 65 per cent. On the 23rd she was sleepless and restless with bilious vomiting and epigastric pain the next day the pain was worse and extended to the precordium tonic contractions supervened with cyanosis loss of consciousness and failing pulse death occurring 30 days after the initial symptom. Necropsy was carried out within 24 hours and the findings as detailed were typical [see this *Bulletin* 1937 Vol. 34 p 289] and are illustrated in a series of good microphotographs. H H S

CIOTOLA (Enrique) La ontogenia del *Trypanosoma cruzi*. La enfermedad de Chagas [The Ontogeny of *T. cruzi* Chagas Disease] —*Prensa Méd Argentina* 1937 May 19 Vol. 24 No 20 pp 1025-1038 With 9 figs.

The author states that he has seen a number of cases of Chagas disease in Peru and has studied the development of the trypanosome in the blood of a patient and in inoculated guinea-pigs. The multiplicity of forms which he considers the trypanosomes assume can lead only to one conclusion namely that he has included in the life cycle almost every object other than normal leucocytes or red blood corpuscles which may be found in blood films not too carefully prepared. The author is evidently dealing with a subject with which he is quite unfamiliar. C A Weyron

KOFOID (Charles C) McNEIL (Ethel) & WOOD (Fae D) Effects of Arsenicals on *Trypanosoma cruzi* in Tissue Culture —Reprinted from *Jl Pharm & Experim Therap* 1937 Apr Vol 59 No 4 pp 424-428.

It has been found that *Trypanosoma cruzi* will undergo cyclical development in tissue cultures of 14 to 16-day embryonic rat heart. Since both the mammalian phase including blood and tissue forms

and culture forms typical of the insect phases of *T. cruzi* are present in the tissue cultures these preparations offer a useful medium for testing and observing the effects of trypanocidal drugs.

It was found that tissue cultures of embryonic rat heart in rat plasma and rat embryo extract showed blood forms of the trypanosomes about the 5th day after inoculation. Consequently it was considered best to add the drugs to be studied to the cultures on that day. Of the three arsenicals tested, our arsenious tri-thioalicylic acid, ultra violet irradiated trypanamide and ultra violet irradiated carbarsone the first proved to be far the most toxic for *T. cruzi*. Our previous experiments had proved that this compound is likewise toxic to tissue *in vitro* and also that it is highly toxic to mammals. Details of the experiments are given. IV 1

GOOD (Sherwin F) Cytological Variations in the Blood and Blood-forming Organs of White-Footed Mice experimentally infected with *Trypanosoma cruzi*—*Univ California Public Zool* 1937 Vol. 41 No 26 pp 389-417 With 27 figs (19 coloured) on 3 plates [68 refs]

The author summarizes his observations as follows —

1 The normal blood of the white footed mouse (*Peromyscus*) includes orthochromatic and polychromatic red corpuscles, neutrophil, eosinophil, and basophil leucocytes, lymphocytes, mononuclears, and platelets.

2 An increased number of large lymphocytes in the peripheral blood from fourteen to thirty-six days after inoculation was produced by experimental infection with *Trypanosoma cruzi* California strain

3 The eosinophil leucocytes were decreased in number from twenty to thirty-six days after inoculation

4 The histology of the normal spleen of *Peromyscus* is described.

5. Infected mice showed enlargement of the spleen up to twice normal size

6 Enlarged bronchial, lumbar and inguinal lymph nodes were found in infected animals.

7 Hyperplasia of the lymphoblasts and lymphocytes of the follicles in the spleen resulting in increase in size of the follicles from three to five times normal, was observed in animals killed twenty-one to twenty-seven days after inoculation

8 Myeloid metaplasia was noted in the spleen of some mice involving decrease of erythroblasts and eosinophil myelocytes

9 Megaleryocytes were increased in sections of spleen and sternal marrow of infected animals

10 Hyperplasia of the reticulo-endothelial cells of the spleen was produced in white footed mice by experimental infection with the California strain of *Trypanosoma cruzi*

IV 1

#### ERRATUM

RHODESIA, SOUTHERN Report on the Southern Rhodesia Trypanosomiasis Committee and Bureau [BRAIR (Chas K.) Vice-Chairman] —22 mimeographed pp. With 1 folding map 1937 Jan. 9

Mr Rupert W JACK, Chief Entomologist, Department of Agriculture Southern Rhodesia has written calling attention to an error in the summary of the above report which appeared in the

*Tropical Diseases Bulletin* 1937 Vol. 34 No 12 p 917 In the summary it was stated that A scheme of tsetse fly research submitted by the Chief Entomologist was considered but the Committee did not feel justified in giving the scheme its unqualified support Mr Jack points out that the Committee in reporting on the scheme of Tsetse Fly Research submitted by him unanimously approved his programme of research and recommended that the work be put in hand as soon as possible The scheme to which the Committee did not feel justified in giving its unqualified support was one drawn up by Mr J Fynn for Tsetse Control by reclamation and development of Africa

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## THE TYPHUS GROUP OF FEVERS

BURNET (Etienne) *Les rickettsioses humaines. Rapport présenté au VIII<sup>e</sup> Congrès de la Fédération des Sciences Médicales de l'Afrique du Nord (Alger 22-24 mars 1937)* [*Rickettsial Diseases in Man*].—*Arch Inst Pasteur de Tunis* 1937 June. Vol. 2 No 2 pp 391-402.

A report presented to the 8th Congress of the Federation of Scientific Medical Societies in N. Africa held at Algiers in March 1937.

The author defines the human rickettsial diseases as those caused by *Rickettsia* which are pathogenic for man and animals and found also in invertebrates such as lice, fleas, ticks and mites. In true typhus man is principally involved whereas in the other typhus-like diseases man is only occasionally involved. In most of these diseases the parasites can only be directly demonstrated in the rodent host or the insect vector.

The following provisional classification is proposed —

## RICKETTSIAL DISEASES.

## Group I Type—Typhus

Vector—			
Lice	Subgroup A	Historic (Epidemic typhus)	
Lice & fleas		B	Mexican typhus, Tabardillo Brill's disease.
		C	Murine typhus
Flea			Shop typhus Malaya
			Ship typhus Toulon
			Murine typhus in Greece, Morocco Tunis, etc.
			Mouse typhus, Tunis

## Group II Type—Spotted Fever

Vector—	
Ticks	Rocky Mountain fever
	São Paulo fever
	Fèvre boutonneuse
	Tick bite fever S. Africa

## Group III Type—Japanese River Fever

Vector—	
Mites	Tsutsugamushi fever
	Scrub typhus, Malaya

## Group IV The recurrent Rickettsioses

Lice	{ Trench fever
	{ Malady of Weil

## Group V

Lice	Trachoma
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Each group and the individual diseases included were passed in review. In the discussion it was pointed out that as tabardillo in Mexico was carried from the rat to man by rat fleas this disease should be placed in subgroup C.

A full discussion of the evolution and origin of the *Rickettsia* followed. The author suggests that the original home of these parasites was possibly in the burrow of a small rodent in Eastern Asia and

transmitted towards the west by human migration clothes and lice multiplying as the colder climates were reached From the Old World typhus was carried to the New and with the Malayan migration completed the circuit of the globe

BULLETIN OF THE HEALTH ORGANISATION (League of Nations)  
1937 Apr Vol 6 No 2 pp 205-222.—The Prophylaxis of Typhus Fever and Vaccination against that Disease I. Introduction. II. Report on the Consultation of Experts. Annexes.

The first part of this report consists of a review of the present position of vaccination against typhus especially with regard to the use of a living vaccine by the methods of BLANC LAURENT and others. The Spanish Government in view of the grave risk of the outbreak of typhus among troops and refugees had asked the League for technical advice regarding measures of protection. A mission was accordingly sent to Spain to investigate the situation. The mission was that so far as they could discover typhus had not yet broken out although conditions favoured an outbreak. A committee of experts was assembled and held several meetings in Geneva during February 1937.

The Committee reported that —  
(a) Living virus vaccines conferred an early protection against typhus whether by preimmunisation only or by preimmunisation followed by immunity.  
(b) Living virus vaccines provided they actually induced infection conferred greater and hence wider protection than did killed vaccines. The mild strains of living virus can protect against infection with virulent strains.

The Committee were also of opinion that in the presence of an epidemic the risks involved in the use of living virus vaccines could be disregarded on the other hand in a country free from typhus but where the disease was a menace killed vaccines were indicated in spite of their increased cost and lesser efficacy as their use did not involve the introduction of a living virus into a country which was at the time free from it.

The experts were agreed that the use of vaccines did not make the standard lousing methods unnecessary, indeed they considered that lousing was of primary importance and should be organized and carried out amongst troops and civilians before typhus had actually broken out. Thorough training of lousing staffs being considered essential to its success. Early detection of cases the isolation of cases and the collection of serum from convalescents were also emphasized.

D H

SHORTT (H E) Les maladies du genre typhus dans l'Inde [Typhus Fevers in India.]—*Bull Office Internat d Hyg Publique* 1937 Nov Vol 29 No 11 pp 2314-2327 [14 refs.]

This report to the International Hygiene Bureau is a review of the papers written by the author and others in the last few years dealing with typhus fevers in India generally and in the Simla Hills in particular. These reports and papers have already been reviewed in this Bulletin 1935 Vol 32 p 172 1936 Vol 33 pp 417-20 909 1937 Vol 34 pp 471-72.

D H

SMITH (R. O. A.) & MEHTA (D. R.) Studies on Typhus in the Simla Hills. Part VII. Attempts to isolate a Strain of XK Typhus from Wild Rats.—*Indian J Med Res* 1937 Oct. Vol. 25 No 2 pp 345-351 [10 refs]

As already reported by COVELL and Mehta a murine typhus virus has been isolated from wild rats caught in or near Kasauli and a similar virus OX19 has been isolated from fleas caught on these rats.

Two waves of typhus are met with in the Simla Hills one occurs in the winter—the sera of these cases agglutinate *Proteus* OX19—the other occurs just after the monsoon in August September and October—the sera of these cases agglutinate *Proteus* OXK.

The present research was carried out with a view to the isolation of the virus of the OXK variety and the carrying out of transmission experiments with ticks and mites. The sera of 1,212 wild rats captured from May 1935 to February 1936 were tested for agglutinins and the results are given in tabular form. It is of interest to note that there was a marked increase during the months of October November and December of sera which agglutinated OXA in significant dilutions that is in the period just after the maximum incidence of cases of this type of the disease was recorded.

Two of the rats showing agglutinins in high dilution for OXA were selected and mites *L. bacoti* were collected from them and emulsified and injected into guinea-pigs but without result.

Fleas of the genus *Nomopsyllus* (*Ceratophyllus*) were fed on these rats and later emulsified and injected into a normal guinea-pig but without result. A nymph of the tick *Rhipicephalus sanguineus* was found on one of the rats. It was allowed to engorge and later removed. The adult tick was emulsified and injected but without result. The rats were then killed and the brains and spleens removed and injected into guinea-pigs but also without result.

With a view to seeing if any change resulted in the nature of the virus (OX19) when transmitted by ticks or mites numerous ticks and larval mites were fed on guinea-pigs and rats infected with the local X19 virus. They were then emulsified and injected into other animals but without producing any infection. It is interesting to note that when fleas *N. similis* were fed on the same infected animals and later injected into guinea-pigs they produced the typical infection of a murine virus fever and orchitis with production of agglutinins in rabbits for OX19.

In August and September when cases of the OXK type of fever were occurring and fleas were very numerous on the rats collected fleas were taken from these rats, emulsified in batches and injected into guinea-pigs. A murine virus X19 was isolated on 3 occasions but no virus of the OXK type. D H

MEHTA (D. R.) Studies on Typhus in the Simla Hills. Part VIII. Ectoparasites of Rats and Shrews with Special Reference to their Possible Role in the Transmission of Typhus.—*Indian J Med Res* 1937 Oct Vol. 25 No 2 pp 353-365 With 2 charts [16 refs]

Two thousand four hundred and fifty-one rodents, rats, mice and shrews, were trapped in and around Kasauli in the Simla Hills in the year 1935-6. These were investigated as regards the ectoparasites

and these were identified and careful records made in relation to the seasonal numbers. The results are fully set out in tables and charts. An interesting point is that at the time (cold weather) when the maximum of the murine typhus cases (OX19) occurs the flea population is at its minimum on the rats and when the OXA cases occur in the months just at the end and after the monsoon August September and October fleas lice and ticks on rats and other rodents are at a maximum.

Amongst the arthropods occurring as external parasites and identified by the author were included the fleas *X. cheopis* *Nosopsyllus simla* *C. canis* and *C. felis*. The principal mites studied were *L. bacoti* and larval forms of *Trombicula deliensis*. Ticks were represented by the larvae and nymphs of *Hyalomma aegyptium* *Rhipicephalus sanguineus* lice *Polyptrix spinulosa*.

The possible rôle of fleas mites ticks and lice in the transmission of typhus in the Simla hills is discussed and it is emphasized that the larval mites and the *Hyalomma* tick may possibly be concerned in the transmission of the rural type (OXA) of typhus. Experiments are now in progress with a view to the isolation of the OXA virus (see previous paper) and its transmission by ticks and mites. D H

JACOB (M) A Note on a Circumscribed Outbreak of a Typhus-like Fever in Muzaffargarh District, South-Western Punjab.—*Indian Med Ga.* 1937 Oct Vol 72 No 10 pp 585-586

An outbreak of fever was reported in two small jungle villages of about 50 inhabitants. Eleven cases of the fever were seen and investigated.

A history of a primary, necrotic sore with enlarged glands was reported in all the cases with a very definite rash. In one instance the friend of one of the patients cut his finger and applied the bleeding point to the primary sore on the hand of the patient a few days later he developed a typical sore on the finger with lymphangitis and lymphadenitis he had high fever which lasted 14 days with a well marked rash. The Weil Felix reaction for *Proteus* OX19 was positive in 6 out of 7 cases tested but only in low dilutions *Proteus* OXA was not agglutinated. D H

KAPILA (C C) & MAITRA (G C) A Severe Case of Scrub Typhus.—*Indian Med Ga.* 1937 July Vol 72 No 7 pp 417-418

The fever in this case lasted for 3 weeks and the temperature chart resembled that of a typhoid case. No primary ulcer was detected but swollen and tender glands were noted in the axilla in the neck and in the inguinal region. On the 6th day an erythematous rash developed and faded in a week leaving a dusky mottling. A positive Weil Felix reaction with OXA was obtained on the 15th day of the fever. D H

HASSETT (C J) A Case of Indian Typhus.—*Indian Med Ga.* 1937 Nov Vol 72 No 11 pp 679-680

A very severe case of fever with delirium and unconsciousness for 5 days with symptoms of meningitis retraction of the head rigidity (379)



of the neck muscles and Kernig's sign positive. A profuse macular rash developed on the body and spread to the face and palms of hands and soles of the feet. The Weil-Felix reaction was positive in a dilution of 1/1000 for *Proteus* OX19 and OX2. The patient later developed a flaccid paralysis of the left arm but this passed off in a few days and he made a good recovery. D H

MODINOS (P) Les fièvres typho-exanthématiques en Egypte. Typhus Fevers in Egypt.—75 pp [110 refs.] 1937 Alexandria Imprimerie A. Procaccia

The first part of this paper consists of a general review of typhus fevers and allied diseases specially dealing with historic typhus, murine typhus and boutonneuse fever the 3 members of the group which are met with in Egypt.

Three cases are described in detail (1) a case of true typhus (2) a case of murine typhus (3) a case of boutonneuse fever. These 3 cases came under the personal care of the writer. The sera of cases 1 and 2 agglutinated *Proteus* X19 but case 3 gave a negative reaction. Blood taken from Case 2 and inoculated into a guineapig produced fever and orchitis in the animal. A guineapig which had been inoculated with a known typhus virus and had reacted was inoculated later with the virus from Case 2 and was proved to be immune. Controls inoculated at the same time reacted with fever and orchitis. Case 3 was diagnosed as boutonneuse fever for the following reasons: the rash was much more profuse than in Cases 1 and 2 and was definitely papular and the elements could be felt under the skin, at the same time the author considers that "boutons" is not a good description they are prominent papules: there was a typical primary ulcer on the arm, the Weil-Felix reaction was negative although tested at the same period in the fever as in the other 2 cases which were then positive.

D H

RIDING (D) Murine Typhus in Egypt.—*Trans Roy Soc Trop Med & Hyg* 1937 July 31 Vol 31 No 2 pp 255-258. With 1 fig & 1 plate

Forty four wild rats captured in a village near Cairo where typhus cases had recently occurred, were examined. None of the sera gave a positive Weil-Felix reaction but 3 guineapigs each inoculated from the emulsion of brain of 4 of the rats developed fever with definite orchitis. It has been possible to passage this virus for 12 generations and successful tissue cultures were also obtained. Rabbits inoculated from the infected guineapigs developed a positive Weil-Felix reaction.

D H

RIDING (D) Sur le typhus murin en Egypte.—*Bull Office Internat. d'Hyg Publique* 1937 Nov Vol 29 No 11 pp 2309-2313 With 8 charts

DURAND (Paul) Un cas de typhus murin chez l'homme dans le bled tunisien [Murine Typhus affecting Man in Tunisia].—*Arch Inst Pasteur de Tunis* 1937 June Vol 28 No 2 pp 336-390 With 1 fig

SPARROW and others have shown that many of the rats in the port of Tunis are infected with the virus of typhus but only one or two cases

of the disease in man have so far been recorded. On the other hand in the country districts around Tunis although over 500 rats were examined none was found to be infected yet cases of true or historic typhus in man are common so far no cases of murine endemic typhus have been recorded in these districts.

In the paper under review Durand describes a case of murine typhus which he has recently discovered. This man was a road surveyor and camped on the roads. rats were numerous around and in his tent. The fever which lasted 14 days was mild there was a profuse rash in inoculated all developed fever and 13 also showed orchitis. There was cross immunity in guinea-pigs with this virus and a historic virus and a murine typhus virus isolated from rats in Tunis but guinea-pigs recovered from infection with the virus were not immune to the virus. The patient's serum gave a positive Weil Felix reaction in 1/16000 for *Proteus OX19*.

DURIEUX (C) & ARQUE (E) Un cas mortel de typhus murin contracté à Dakar [A Fatal Case of Murine Typhus in Dakar]—*Bull Soc Path Exot* 1937 July 7 Vol 30 No 7 pp 539-542 With 1 chart D H

Cases of typhus due to the murine or endemic virus have already been described by the authors as occurring in Dakar 4 new cases have since been met with and one of these which proved fatal is detailed in this paper. The patient had high fever with delirium and stupor on the 7th day a maculo-papular rash developed and spread over the body the face and the hands. The Weil Felix reaction at this stage was positive in a dilution of 1/500 for *Proteus OX19*. The delirium continued and stiffness of the neck dilatation of the pupil and clonic movements of the limbs developed from the blood of the 16th day of the fever. The virus was isolated from the pupil patient and produced fever and orchitis in guinea-pigs. The authors conclude that it is not correct to describe endemic typhus as invariably a mild disease it may be severe and even fatal as in this case.

GOSDEN (Minnie) A Suspected Case of Non-Epidemic Typhus in a Child in Trinidad.—*Trans Roy Soc Trop Med & Hyg* 1937 Nov 30 Vol 31 No 3 pp 359-362 With 1 chart D H

A case of fatal illness in an African child aged 4 months with a haemorrhagic typhus-like rash and gangrene of the hands. The serum taken post mortem agglutinated *Proteus OX19* and OX2 in a dilution of 1/80. *Proteus OXA* negative all controls with the same cultures were negative. No cases of typhus have been reported in Trinidad for many years and so far no other cases have been seen.

PATINO (L.) AFANADOR (A.) & PAUL (J. H.) A Spotted Fever in Tobia, Colombia. Preliminary Report.—*Amer J Trop Med* 1937 Sept Vol 17 No 5 pp 639-653 [10 refs.] D H

A Yellow Fever Commission was at work in Bogotá the capital of Colombia and cases of suspected yellow fever were reported from Tobia—rural district about 100 kilometres distant. The disease was confined to (174)

to the small area of Tobia one narrow valley 4 kilometres long by  $2\frac{1}{2}$  wide of the 270 inhabitants of this valley 63 developed the fever and 60 of these died. Several cases in the acute stage were seen and investigated by members of the Commission. High fever and delirium with marked central nervous manifestations were noted the most characteristic symptom was the rash which appeared on the 3rd day and spread over the whole body of the patient at first the rash was maculo-papular later haemorrhagic areas appeared Albumen was present in the urine

*Laboratory investigations*—Two guineapigs were inoculated with the blood from a case of the disease both developed fever and both died Rickettsia were demonstrated in the cells in the peritoneal fluid. This strain of virus was passaged 17 times congestion of the testicles was marked and all the experimental animals died Blood from 6 further cases was injected into guineapigs all reacted and all died. Head lice were collected from one patient and emulsified and injected into guineapigs these also reacted with fever and died. Rickettsia were demonstrated in the cells in the peritoneal fluid. Lice collected from healthy people gave no reaction when injected, nor did bed-bugs ticks or mites Blood cultures from patients were all negative so also were the Widal and Weil-Felix reactions which were tested at all stages of the fever and in convalescence All tests for yellow fever were negative The commission decided that the disease is not yellow fever but resembles São Paulo typhus in some but not all respects, Weil-Felix reaction with OX19 OX's and OXK negative

A post-mortem examination was carried out in one case the most marked feature was intense congestion of the meninges

*Rhipicephalus sanguineus* *Imblomma cayennensis* and mites were all found in the valley but in view of the house infection character of the disease (several households were completely wiped out) the authors suggest that an Ornithodoros tick may be the vector This tick was found in large numbers in the dust in the houses D H

MONTESTRUC (E.) GERMAIN (A.) & CLITANDRE (S.) Premiers cas de typhus endémique bénin diagnostiqués à la Martinique. [First Cases of Benign Endemic Typhus discovered in Martinique.]—*Bull Soc Path Exot* 1937 Nov 10 Vol 30 No 9 pp 746-749

Cases of continued fever had been noted in which blood cultures proved sterile and the Widal reaction was also negative Accordingly the sera of such cases were tested for the Weil-Felix reaction and several positive results were obtained Two cases are described In both instances rats were numerous in the houses

In one case the fever lasted 12 days and the Weil Felix reaction was positive in a dilution of 1/1000 for *Proteus* X19 In the other case the fever lasted 14 days and a profuse rash was noted which spread to hands and feet the Weil-Felix reaction was positive 1/400 with *Proteus* X19 negative with *Proteus* OXK D H

HSIEH (T. Y.) CHANG (Shih-Lu) & YANG (Chi-Shih) Typhus Fever in Changsha.—*Chinese Med J.* 1937 Sept. Vol. 52 No. 3 pp 383-388

The earliest report of typhus in China is an epidemic in Shanghai in 1850 Since then periodic epidemics have been reported in the great cities in times of famine and usually accompanied by relapsing fever

In the present paper 14 cases of typhus are described. These occurred in 1934/8 the cases were moderately severe with high fever but little delirium and a rash was present in all but one. All cases recovered and convalescence was rapid. The authors consider that these cases differ from cases of typhus reported in N China and may be of the endemic or murine type

D H

PUBLIC HEALTH NOTES Adelaide, 1937 July No 23 pp 43-44 —South Australian Typhus Fever

The author states that there is ample evidence that endemic typhus in South Australia is the same as that in other parts of the world. The clinical nature of the illness and the agglutination reactions are the same. Yet although many rats and rat fleas captured in districts of South Australia where cases of the disease were occurring have been examined in the laboratory it has not been possible to isolate a typhus virus from any of these. It is suggested that cases of the disease in the early stages should be made available for examination and indication for the diagnosis of such cases prior to the appearance of the Weil Felix reaction are given

D H

BENGTSON (Ida A) Cultivation of the Rickettsiae of Endemic (Murine) and Epidemic (European) Typhus Fever in Vitro —*Public Health Rep* 1937 Sept 24 Vol. 52. No 39 pp 1336-1340

The same methods of culture as were used for the Rickettsia of Rocky Mountain fever were also used to cultivate the virus of endemic and epidemic typhus. Mastland's medium using Baker's instead of Tyrode's solution. For subculture small portions of the tissue were removed and added to the fresh cultures with fresh minced tissue. Successful subcultures were also made from the fluid without any actual tissue. Seventeen successful subcultures were made. Rickettsia were very numerous in the stained films. Similar results were obtained with the virus of epidemic typhus but the Rickettsia were not so numerous

D H

ZINSSER (Hans) WEI (H) & FITZPATRICK (Florence) Nouvelles méthodes de culture de Rickettsiae du typhus à propos de la production de vaccins [Agar Slant Tissue Cultures of Typhus Rickettsia.] —*C R Soc Biol* 1938 Vol. 127 No 3 pp 229-232

Four per cent agar solution in water is mixed with an equal volume of double strength Tyrode's solution to which 50 per cent. horse serum has been added. The reaction must be pH 7.4 to 7.6 and should be maintained at this figure. Gumeapig tunica tissue is finely minced and is infected by immersion in old cultures of typhus Rickettsia. This is then buttered on the surface of the agar tubes in 6 days growth appears. It is proposed to use this method of agar culture in the preparation of vaccines.

D H

The animals did not react in any way. There was no fever and no symptoms of illness but when blood was taken from the heart 10 to 18 days after inoculation and injected into guineapigs these animals became infected and gave the typical reactions of São Paulo typhus virus. The infected opossums were killed and examined and typhus nodules were demonstrated in or near blood vessels in the liver lungs and kidneys.

Opossums were also infected with a São Paulo virus which had been passed for a long time in guineapigs but this virus gave only modified reactions when inoculated into guineapigs from the opossum.

ii. It was also shown that it is possible to passage the São Paulo typhus virus through a series of opossums. 6 passages were obtained. Some modification of the virulence of the virus was also noted here. This may be partly explained by the possibility that some of these opossums had been infected in nature (see below).

iii. Several opossums were captured near São Paulo and examined and from 5 of these a virus was isolated which gave the typical reaction of São Paulo typhus virus in guineapigs. After passage in guineapigs this virus killed about 85 per cent. of the animals inoculated.

Guineapigs which had recovered from the effects of the human virus of São Paulo typhus were immune to the virus isolated from the opossums. Ticks (*Amblyomma cayennense*) were fed on guineapigs infected with the virus derived from the opossum and when fed later on normal guineapigs infected these. Rabbits infected with the virus obtained from opossums developed fever and the sera gave a positive reaction for OVI9.

It is proposed to carry out further experiments using opossums bred in the laboratory so as to eliminate errors due to natural infection. The writer claims that the opossum is the reservoir or one of the reservoirs of the virus of São Paulo typhus in nature. D H

IRISH JOURNAL OF MEDICAL SCIENCE. 1938. Jan. pp. 11-19.

—A Case of Sporadic Typhus, with Some Notes on the Disease.

A sporadic case of typhus occurring in Cork city where no cases of typhus had been recorded for 8 years. The patient was an architect and in the course of his employment he had to visit slum property in a house in a most insanitary state and in an area which in the old days was known as a typhus district. Ten days later he developed fever and on the 4th day a macular rash appeared on the body and spread to the hands and limbs but not the face. On the 6th day "his appearance was notably dusky. His eyes were suffused and bloodshot and he had a wild distraught appearance. His tongue was dry and covered with a thick brown fur.

The Weil Felix reaction tested on the 6th, 10th and 20th day of illness was negative. In spite of this and the fact that the temperature fell to normal on the 7th day the case on clinical grounds was diagnosed as typhus. No other cases have been reported in the neighbourhood.

A full discussion of the subject follows and it is emphasized that these sporadic cases probably infected with the rat typhus virus may not give a positive Weil Felix reaction and must be diagnosed on clinical grounds alone. Practitioners should be on the outlook for such cases. It is also suggested that investigation of the local rat population might reveal the existence of a focus of typhus infection.

Some very interesting historical records of famine and jail fever are included. D H

AUBARET Fièvre exanthématique à inoculation palpebrale  
Infection via the Eyelid]—*Bull Soc Path Exot* 1937 [Typhus  
Vol. 30 No 10 pp 832-834 Dec 8

A patient who was seen on 20th August 1936 had a small ulcer on the margin of the lower eyelid of the left eye there was no conjunctivitis but swollen and painful glands were noted in front of the ear and at the angle of the jaw. Temperature was normal but the patient complained of feeling weak and tired. She stated that on the 12th August she had crushed a tick removed from a cat and that some of the content of the tick had splashed into her eye. Two days later she noticed a small pimple on the eyelid. The patient was admitted to hospital and although the temperature remained at or about normal a typical boutonneuse fever rash developed a few days later. The ulcer healed rapidly and disappeared two days after the appearance of the rash which persisted for some weeks. The interesting point in this case was that the primary sore a minute ulcer occurred on the eyelid and was accompanied by involvement of the neighbouring lymph glands yet there was no inflammation of the eye.

RAYBAUD (A) Tache noire et fièvre boutonneuse [Tache noire and  
Boutonneuse Fever]—*Bull Soc Path Exot* 1937 Oct. 13  
Vol. 30 No 8 pp 624-627 D H

The author considers that the tache noire is diagnostic in boutonneuse fever but asks can one diagnose a case of fever in which the primary sore is present but in which there is no rash i.e. boutonneuse fever and bouton ?

Three typical cases are reported with rash and primary sore the wife of one of these patients developed fever with a typical primary sore but no rash and still another case is reported of the same type. That is 5 cases of boutonneuse fever were observed at the same time and in the same families 3 of them had fever rash and primary sore 2 had fever and primary sore but no rash.

SPARROW (Hélène) & ROUSSEL (Henri) Recherche du *Proteus*  $\lambda 19$   
dans le sang de sujets typhiques et non typhiques [Typhus  $\lambda 19$   
in the Blood of Typhus Patients.]—*Arch Inst Pasteur de Tunis*  
1937 June Vol. 26 No 2 pp 257-265 D H

In 1935 in a small outbreak of typhus the authors carried out blood cultures in all the cases and in 50 per cent. of the cases *Proteus*  $\lambda 19$  was isolated [see this Bulletin 1936 Vol. 33 p 434]. This result was so unusual that the writers repeated the work in 1936. 565 blood cultures were made these were from samples of blood sent to the laboratory for the Weil Felix reaction. The serum was used for the blood and the clot placed in the culture medium. 348 of these samples of blood were from typhus cases 309 gave a positive Weil Felix reaction and *Proteus*  $\lambda 19$  was isolated 10 times or in 2.8 per cent. of the cases. One hundred cultures were made from cases of fever other than typhus and in 6 instances *Proteus*  $\lambda 19$  was isolated 6 per cent. All the strains isolated gave the true reaction of  $\lambda 19$  and the cultures were agglutinated in high titre by specific serum from cases of typhus and from laboratory animals. In view of the high percentage of positive results in the first outbreak the authors carefully considered the possibility of accidental contamination but definitely exclude this.

D H

numbers of rickettsial bodies in the peritoneal fluid and were thus able to prepare vaccines from this fluid. This work was repeated on the same lines in Mexico City but without success. Castaneda in the present paper shows that the reason for the failure was that in infected rats in Mexico City the temperature was over 39°C. He finds that if rats and rabbits or guineapigs are infected with typhus virus and the temperature is kept under 38°C, large numbers of *Rickettsiae* appear in the peritoneal fluid whereas if the temperature rises above that figure very few *Rickettsiae* can be seen.

The practical application of these studies to the preparation of typhus vaccine is being considered. D H

NOURY (M) *Essais d'immunisation contre le typhus exanthématique par des doses répétées de vaccin tué.* [Immunization against Typhus by Killed Vaccine.]—*C R Soc Biol.* 1937 Vol. 125 No 22 pp 849-850

An emulsion of the brain of a guineapig infected with murine typhus was prepared of a strength of 5 per cent. in 1 per cent. carbolic this was stored in the ice chest. Daily injections of 1 cc of this emulsion were given to 12 guineapigs over a period of 1 month when tested none showed any evidence of protection. Another batch of 7 guineapigs were given a similar course of injections. These were tested 30 days after the last dose of vaccine none was protected.

The author's conclusions are that killed vaccines do not protect living vaccines are necessary for immunisation. D H

SCHÄFER (Walther) *Zur Frage der Schutzimpfung gegen Fleckfieber (Immunisierungsversuche an weissen Mäusen mit Impfstoffen nach dem Verfahren von Lalgret und Durand)* [Concerning Vaccination against Typhus. Immunization of White Mice by the Method of Lalgret and Durand.]—*Arch u d Staatsinst f Exp Ther u d Georg Speyer Haus zu Frankfurt a M* 1937 No 34 pp 39-50

An extensive research which is fully recorded by means of protocols of experiments.

The main conclusion is that the best results were obtained when the virus was emulsified in yolk of egg and also in oil, and was given in 2 doses the test doses were then given 24 days later by this method the mortality in mice was reduced from 66 per cent. to 6 per cent.

When dried vaccine (brain of infected guineapigs) was emulsified in yolk of egg only the protection afforded was not nearly as good it is suggested that this may be due to destruction of the virus by the drying process it is only when living vaccine is injected that protection results. D H

1 OKAMOTO (Yutaka) *Experimental Studies on Mice concerning Typhus Fever 2. Demonstration of Rickettsiae in Mice inoculated with Endemic Mild Typhus Fever Virus.*—*Kioto Arch Experim Med* 1937 May Vol. 14 No 2 pp 99-112.

2 — *Experimental Studies on Mice concerning Typhus Fever 3. Mice Passage of the Virus of the Epidemic Typhus Fever*—*Ibid* pp 113-124 [14 refs]

1. In order to infect mice with the virus of endemic typhus it is necessary to employ large doses and to inoculate intraperitoneally

If this is done infection follows and Rickettsiae are found in all organs but are most numerous in the endothelial cells lining the peritoneal and abdominal cavities they are also found free in the fluid. These Rickettsiae begin to appear about the 2nd day after inoculation and are most numerous on the 4th and 5th day.

ii. Using the same technique as above 412 mice were inoculated with the epidemic virus but only in 2 could the Rickettsia be detected and only in small numbers it was not possible to subinoculate from these mice in marked contrast to the behaviour of the endemic virus. The epidemic virus is difficult to establish in mice and dies out at once.

*D H*

VIOLLE (H) Etude expérimentale du typhus exanthématique. Sa transmission avec fièvre et exanthème chez le porc [Oral Transmission of Typhus to the Pig]—*Bull Acad Med* 1937 Dec 28 101st Year 3rd Ser Vol. 118. No 40 pp 809-812. With 3 figs.

A two months old pig was fed on the brain of a rat infected with endemic typhus. After an incubation period of 10 days the pig developed fever which lasted for 18 days blood was drawn off from the pig at the height of the fever and inoculated into two white rats both rats developed fever and were later proved to be immune to typhus virus. Towards the end of the fever the pig developed a very definite macular rash on the flanks which became petechial. Veterinary surgeons who examined the pig said they had never before seen such a rash on a pig and agreed that it was due to the typhus infection. [A similar rash has already been described on white guineapigs infected with endemic typhus virus.]

*D H*

BLANC (Georges) & BALTAZARD (Marcel) Immunité croisée entre la fièvre boutonneuse et la fièvre pourprée des Montagnes Rocheuses Vaccination du cobaye contre ces deux maladies par un virus vivant bilité de fièvre boutonneuse [Crossed Immunity between Boutonneuse Fever and Rocky Mountain Spotted Fever]—*C R Acad Sci* 1937 Oct. 4 Vol. 205 No 14 pp 578-580.

Five strains of virus of boutonneuse fever and one strain of Rocky Mountain fever were employed in these experiments.

Seventy three male guineapigs and 21 female were inoculated with the virus of boutonneuse fever all reacted when tested later with Rocky Mountain fever virus all were immune. Three Macacus monkeys were inoculated with boutonneuse virus and reacted when tested later with Rocky Mountain fever virus all 3 were immune 2 controls died.

Four men who had had boutonneuse fever were first tested with large doses of the homologous virus and none reacted. They were then given large doses of Rocky Mountain fever virus All proved to be immune.

Guineapigs were immunized with doses of bile-treated vaccine (living virus) of boutonneuse fever there was no reaction later they were found to be immune to test doses of the homologous virus and also to the virus of Rocky Mountain fever.

*D H*



cases of verruga and also in cutaneous nodules produced in monkeys by inoculation with human material from Oroya fever and verruga. The morphological identity of the organisms and the essential identity of the patterns produced by them within the cells in all of the above tissues furnish additional evidence that Oroya fever and verruga have a common etiological agent *Bartonella bacilliformis*.

III The 3 types of Carrion's disease seen in human cases the cutaneous form, the anaemic form and the asymptomatic form were all reproduced in monkeys. The cutaneous form was produced by the inoculation of (a) infected lymph nodes from a patient with the anaemic form (Oroya fever) (b) human verruga tissue (c) cultures of *Bartonella* from the blood of human verruga cases. The anaemic form (Oroya fever) was reproduced in one splenectomized monkey by the inoculation of blood from an Oroya fever patient. This animal died and showed a multiple infection of his red cells with *B. bacilliformis*.

The asymptomatic form was produced in monkeys by the inoculation of blood from Oroya fever patients.

IV Healthy inhabitants of a village in the verruga zone were discovered to be asymptomatic carriers of *B. bacilliformis*. Five of these yielded positive blood cultures, 3 had no history of any illness, 2 had had verruga some time previously.

V Sandflies *Phlebotomus verrucarum* and *P. meguchii* were fed on patients showing many bartonellae in blood films. These flies became infected with a bartonella-like organism not as yet identified. A similar infection was found in only one of the many wild sandflies examined. Transmission experiments limited in number with sandflies and monkeys resulted negatively so far.

D Harvey

## DENGUE AND SANDFLY FEVER.

COLES (Alfred C.) A Microscopical Inquiry into the Aetiology of Dengue, Sandfly and Yellow Fever—*Jl Trop Med & Hyg* 1937 Sept. 15 Vol 40 No 18 pp. 209-214 With 4 figs [14 refs.]

The author has been able to find in Giemsa-stained blood films from cases of dengue fever in man yellow fever in monkeys (first three or four days) and sandfly fever in man (first 24 hours) granules which are within the red blood corpuscles or free in the plasma which he regards as the causal organisms of these diseases. Though many of the granules are evidently too large to be filter passers some are sufficiently small to be of this nature. They are to be found in the blood only during those periods of the disease in which the blood is actively infective on inoculation. The paper describes in detail the technique used by the author and gives his reasons for the conclusions he has reached.

C M Wemyss

KARAMCHANDANI (P V) Study of 110 Cases of Dengue Fever in the Madras Penitentiary—*Indian Med Ga* 1937 Sept Vol. 72 No 9 pp. 532-534 With 28 charts

One hundred and ten cases of dengue fever occurred in the Madras Penitentiary. There was sudden onset of the fever with intense

headache and backache slow pulse and leucopenia. A terminal eruption was not noted in any of the cases but in one European case a typical dengue rash developed. Fifty four of the cases showed the saddle back type of temperature chart. Seventeen showed a continuous fever lasting about 6 to 7 days and 39 cases had fever for 3 to 4 days only without any secondary rise. Of 3 000 mosquitoes captured in the jail only 3 were *Aedes* the remainder were *Culex* and were mostly gorged females. The author suggests that *Culex* may be the vector in this instance but gives no further proof. The editor in a footnote is not convinced.

D Harvey

MELISSINOS (Johann) Pathologisch anatomische Untersuchungen bei Denguefieber [Pathology of Dengue.]—*Arch f Schiffs u Trop Hyg* 1937 Mar Vol. 41 No 3 pp 321-331

Three cases are reported in detail these were some of the fatal cases met with in the big epidemic in Athens in 1930. The types of pathological changes seen were inflammatory haemorrhagic and oedematous. It is also suggested that in dengue fever as in smallpox measles and influenza there may be a form of encephalitis.

D H

LE GAC (P) Etude de la bradycardie au cours de la fièvre à pappataci. [Bradycardia in Pappataci Fever]—*Bull Soc Path Exot* 1937 July 7 Vol. 30 No 7 pp 536-539 With 3 figs

According to the author bradycardia is a constant symptom of sandfly fever but is not met with until the second day of the fever and is accompanied by severe headache. This slow pulse rate is due to a hypertension of the cerebrospinal fluid and is relieved by lumbar puncture. In some cases the pulse rate may be as low as 40 per minute and the pulse rate remains low in some cases for several days after the fever has ceased.

D H

### SELLAR FEVER

JACK (W A M) Sellar Fever—*Trans Roy Soc Trop Med & Hyg* 1937 Nov 30 Vol. 31 No 3 pp 281-296 With 5 charts.

*Definition*—A mild fever showing a saddle back (hence the name) temperature chart and lasting in the typical form for 5 days but which may have a duration of any period from 12 hours to 6 or more days. It is accompanied by frontal headache congestion of the throat and a slow pulse and there is a special liability to relapse. The author has carried out investigations into this disease among Indian troops for many years and in many stations in northern India he has personally observed more than 1 000 cases. The principal investigations took place in Razmak in 1932 Ambala in 1933 and in Sialkot from 1934 to 1937. In Sialkot in 1936 over 500 cases occurred in a garrison strength of Indian troops of 2,000.

A careful clinical description of cases is given in detail the incubation period is difficult to determine but lies between 5 and 20 days the onset is sudden and accompanied by shivering as a rule. Frontal headache and a sense of fever are invariably present sore throat is

noted in 75 per cent. of cases there may be backache and general pains. The course of the fever usually lasts 5 days, but may be any thing from 12 hours to 6 or more days, and may occasionally be prolonged by relapse or relapses. The temperature may reach  $104^{\circ}$  or may be only slightly above normal. In 2 per cent. of the cases an early erythematous rash was noted on the first day but later rashes were not seen. Apart from some enlargement of the glands draining the pharynx no enlarged glands were noted. A leucopenia occurs with relative increase of lymphocytes at the expense of polymuclear cells and eosinophiles. Of 411 cases observed in 1934 to 1936, 53 relapsed, or 12.9 per cent. these relapses usually begin on the 6th day there may be more than one relapse as many as six have been noted in one case. Bronchitis is the only complication noted. A striking feature of the disease is the mildness of discomfort and even when the temperature is high and fever prolonged there is no toxæmia and the general appearance of the patient is good and convalescence is rapid.

The saddle back type of the temperature chart is caused by a distinct drop in the earlier part perhaps to normal limits which divides the course into 2 periods this remission usually commences either on the second or third morning but may commence on the first evening. Typical temperature charts are given of cases with fever of 1 2 and 3 days duration 4 days duration and 5 and 6 days duration.

**Diagnosis.**—The throat condition is a symptom of the disease and not the cause of the fever there is no true tonsillitis and no catarrh.

As regards the differential diagnosis from dengue, sandfly fever and influenza, diseases with which sellar fever is most readily confused, this disease occurs frequently in the cold weather in Razmak at an elevation of over 6 000 feet when deep snow lies on the ground and there are no *Aedes* mosquitoes or other winged insects. Dengue never occurs under such conditions. There are no late rashes in sellar fever and no "break bone" pains or joint pains and no injection of the conjunctiva the remission of temperature occurs 24 hours before that in dengue fever and the disease lasts much longer than sandfly fever and occurs in places where neither phlebotomus nor sandfly fever are met with.

The aetiology is still in doubt but an insect vector is probable. Lice are excluded as careful lousing of units had no effect on the incidence and attempts to transmit the disease by means of lice failed. The bed-bug is a possible vector. Bed-bugs were fed on patients and later fed on volunteers two of these developed fever but as cases were occurring at the time natural infection could not be ruled out and later attempts failed. The disease is definitely not spread by food, milk or water and does not spread in hospital to other patients or attendants. Blood taken from a patient and injected into a volunteer had no effect nor had swabs from the throats of patients. The disease is endemic throughout the year sporadic cases occur in the barrack rooms, then more and more cases in one barrack resulting in a series of minor epidemics. Many cases may occur in a barrack room and other companies of the same regiment camped within a short distance may have only one or two cases, although the food and water are the same for all. British officers of units are rarely infected and if they are the disease does not spread to their families.

**Conclusions.**—A very large number of cases of mild fever characterized by a saddle-back temperature, frontal headache, slow pulse and sore throat have been observed in various stations in Northern India. The clinical features suggest a resemblance to the

sandfly-dengue group but there are many definite differences. The disease has a distinct tendency to relapse and it is these relapses which form a large proportion of the otherwise undiagnosed fevers common amongst Indians in the North of India. The existence of an insect vector perhaps the bed-bug is possible.

There can be no doubt that this is a disease *sui generis* hitherto undescribed and to it the name *sellar fever* is now given in allusion to the typical course of the fever. [This name might give rise to confusion as dengue is also a *sellar fever*.]

D H

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## HELMINTHIASIS.

- i CHANDLER (Ass C) *Studies on the Nature of Immunity to Intestinal Helminths. V Experiments on the Role of the Skin in Parenteral Immunity and Further Experiments on Passive Immunization in Nippostrongylus Infections in Rats.*—*Amer J Hyg* 1937 Sept Vol 28 No 2 pp 292-308 With 1 fig [10 refs]
- ii — *Studies on the Nature of Immunity to Intestinal Helminths. VI. General Résumé and Discussion.*—*Ibid* pp 309-321 [32 refs.]

1. 1 Experiments are described which indicate that rats previously infected with *Nippostrongylus* by skin penetration allow as many larvae to reach the intestine as do rats previously infected by subcutaneous injection or by intestinal implantation, whether the test infections are given through or under the skin. More larvae are found in the intestines of uninfected controls due to the failure of many larvae to establish themselves in the intestine after reaching it in rats already harbouring intestinal worms.

2. Histological methods failed to demonstrate increased retention of larvae in skin previously exposed to penetration by *Nippostrongylus*, although leukocytic infiltration and eosinophilia were enhanced.

3. Immunization with live *Ancylostoma caninum* larvae afforded no immunity to *Nippostrongylus*. Rats repeatedly infected with *A. caninum* by skin penetration showed less skin reaction to a heavy penetration by this worm than did rats repeatedly infected by subcutaneous injection.

4. Rats immunized to *A. caninum* failed to show any enhancement of skin reaction to penetration by *Nippostrongylus* larvae, thus proving the heightened skin reaction to be specific.

5. Rats treated with 6 cc per 100 gm of serum from rats highly immunized by repeated skin penetrations by *Nippostrongylus* showed no effect on the successful migration of larvae to the intestine but showed evidence of a slight effect on establishment of worms in the intestine and

administered. In 1935 he studied the question more thoroughly and has now observed about 300 patients so treated. His prescription is —

Ferr. et ammon. cit.	20.00
Manganes cit	0.40
Cupri cit	0.10
Vinum de Málaga vel Elix. simpl.	300.00

He concludes —

- 1 Ninety per cent. of cases are cured in 10–15 days.
- 2 As a rule the limit of tolerance is 4 to 6 gm. daily but some can take up to 12 gm. the only untoward symptom being diarrhoea which ceases when the dose is reduced.
- 3 There is no need for the patient to go on any special diet.
- 4 It benefits the associated anaemia, raising the number of red cells and the haemoglobin content.
- 5 It is cheap and therefore specially recommends itself for the poor who are the chief sufferers from this form of helminthic infestation.
- 6 The drug can be put up in effervescent pastilles each containing one gram of the drug this is dissolved in a cup of sweetened water and is well taken by children.

H H S

WRIGHT (Willard H.) BOZICEVICH (John) & GORDON (Leon S)  
Studies on Oxyuriasis. V. Therapy with Single Doses of Tetrachlorethylene—*Jl Amer Med Assoc.* 1937 Aug 21 Vol. 109 No. 8. pp 570–573

The studies II, III and IV are still unpublished. For Study I see this *Bulletin* 1937 Vol. 34 p. 873.

In experiments reported in this paper forty-seven boys infested with pinworms were treated with single doses of tetrachlorethylene administered orally at the rate of 0.1 cc. for each year of apparent age. The administration of this drug in a solution of magnesium sulfate provoked disagreeable reactions in a considerable percentage of twenty-five cases but these reactions were largely obviated by the substitution of magnesium citrate as a purgative in the remaining cases.

Of forty-four infested boys who received tetrachlorethylene orally and were checked by post-treatment swab examinations on approximately the fourteenth and twenty-first days after treatment, thirty or 68.2 per cent. were negative but the true percentage of cures is probably about 47.7 per cent. as arrived at after the application of a correction figure of 30 per cent. for positive cases not disclosed by two swab examinations.

Three boys received magnesium citrate solution alone followed the next morning by an enema consisting of 1 cc. of tetrachlorethylene in a coconut oil soap emulsion to 1 liter of water. These three boys were negative on post-treatment swab examinations but in no case did the magnesium citrate solution remove all worms.

The number of worms recovered from individuals in these tests varied between 1 and 4,938 the average infestation was 235.8 worms.

Evidence indicated that tetrachlorethylene administered orally in single doses was more effective in eradicating relatively light pinworm infestations than it was in eradicating relatively heavy infestations, since only two of our thirty negative cases treated in this manner showed infestations above the mean.

So far as there is available evidence it would appear that tetrachlorethylene is one of the best drugs for a single-dose treatment for pinworms. It is especially effective apparently for light pinworm infestations but

will probably fail to effect cures in the majority of persons heavily infested with pinworms, a failure which would probably be shared by other anthelmintics of merit when similarly administered."

C. L.

CRAM (Eloise B.) JONES (Myra F.) REARDON (Lucy) & VOLAX (Mabelle O.) Studies on Oxyuriasis. VI. The Incidence of Oxyuriasis in 1,272 Persons in Washington, D.C., with Notes on Diagnosis.—*Public Health Rep* 1937 Oct 22. Vol. 52. No. 43. pp. 1480-1504. '39 refs

The evidence indicates that pinworms are much more prevalent than is generally believed, that the usual methods employed in diagnostic laboratories and in the majority of surveys, namely faecal examination for eggs is not reliable for their detection, and that examinations by a method such as the use of the NIH swab should be repeated several times before a negative diagnosis is justified.

Of the 1,272 examined, 628 came from the general population, were mostly of low social-economic level, the examinations were often made because of clinical symptoms or because other members of the family had been found positive while 644 were (apart from 27 girls) boys aged from 11 to 19 in institutions. For those from the general population, the NIH Cellophane scraper was used of boys in institutions 400 who were already inhabitants of these institutions were examined by various swabs and scrapers before the Cellophane scraper was fully established, and thereafter 217 boys were examined by Cellophane scraper at the time of admission.

Of the 628 persons from the general population, 408 were negative, the number of scrapings being 1 to 14 though 87.3 per cent. had not more than two the sexes were about equal, and 82.8 per cent. were under 19 years old. Of the 222 positives the percentage of infected among 478 white persons was 41.2 and among 90 coloured persons 21.1 the highest percentages were in those from 6 to 18 years of age the need for repeated examination is shown by the fact that the percentages of the 222 which were found positive in 1 to 6 examinations were respectively 80.7 83.7 88.2 99.1 99.5 100 by such repetition of examination the percentage of positives was raised by from 28.5 to 35.4.

Of the 617 boys in institutions the percentage of infection in the 400 who were already living in them and who had been examined by swabs of various kinds was 3.7 in 217 newly admitted and examined by the Cellophane scraper it was 7.8. The uselessness of faecal examinations in the detection of this infection is further shown by the fact that they were made (the method is unstated) in 42 persons known to be infected and there were eggs in 4 or 9.5 per cent. only.

C. L.

NICOLESKO (P.) STRAT (C.) & LAMANDI. Diagnostic étiologique de la septicémie trichomonque. [Trichinosis Septicæmia Diagnosed by the Disclosure of its Causal Organism.]—*Bull Acad. Méd Roumanie* 1937 Vol. 4 No. 5. pp. 585-589.

The paper urges the wisdom of blood examination for larvae of trichinella in any early case of suspected trichinosis fever.

They note work by BUSSE of Posen who found at autopsy of persons over 60 years of age trichinae in the muscles of 18 per cent. and who holds that the cooking habits of Germans easily explains this high incidence which he says exceeds that of American countries. In Rumania infection cannot be combated effectively since peasants will not take their beasts to veterinary surgeons nor have autopsies been used to check the incidence in man. Eosinophilia and the finding of larvae in the faeces are uncertain in diagnosis for different reasons. Biopsy is difficult and it is late before it is of use for diagnosis moreover in Rumania it has been refused more often than not. By examination of blood for embryos seven cases were investigated 4 in one family, 2 in another the third being solitary larvae were found in the blood in 2 on the seventh and twelfth days respectively. The method used was that of Stäubli 10 cc. of blood were laked in a 100 cc. of a 30 per cent. solution of acetic acid and the centrifuged precipitate examined. In one case this deposit from 20 cc. of blood was spread over 40 to 50 slides and there were found two complete and some partially destroyed embryos. In the case examined on the 12th day when the temperature was 37.5 there were found some embryos damaged by centrifuging. This method is advised as easy to put through and within the capacity of every practitioner

C. L.

SAWITZ (Willi) Are Post-Mortem Statistics on Trichinosis Valid for the Living Population?—*Amer. J. Public Health.* 1937 Oct. Vol. 27 No 10 pp 1023-1024

The answer to the question in the title is Yes—so far as the relatively small numbers examined are evidential.

Sawitz made 200 autopsies and 200 examinations by skin test. In the autopsies on 200 bodies from the Truro Infirmary and the Charity Hospital, New Orleans the examination for measles was by artificial gastric digestion of 50 gm. of diaphragm and 10 gm. of pectoral muscle in each case. The intradermal skin test was made on patients of the Truro Infirmary and Hutchinson Memorial Clinic of the Tulane Medical School. The antigen for the skin test was 0.1 cc. of a 1 in 5 000 solution of dried and powdered trichinella larvae in Coca's solution injected intradermally the result being read after 15 minutes. The results gave a 5 per cent. infection both in the dead and in the living. Of those tested for skin reaction 43 were negroes. The absence of a reaction in them was probably due to the difficulty of seeing the reaction on coloured skins. If so infection in the living is greater than the autopsy tests indicate. Apart from that exception, the figures by sex, race and age are, it is noted, remarkably near. No person in either series had given a clinical history of trichinosis

	No Cases Examined	Positive	Percent Positive	Percentage Distribution by							
				Sex		Race		Age in Years			
				M.	F.	W.	C.	0-19	20-39	40-59	60-79
Autopsies	200	10	5	5.8	3.7	7.1	3.4	0.0	3.3	4.9	10.0
Living Persons	200	10	5	7.1	3.8	6.3	0.0	0.0	3.8	5.3	15.7

C. L.



JONES (Maurice) & WELLS (John J.) Trichinosis. A Report of Two Cases.—*U.S. Nav. Med. Bull.* 1937 Oct. Vol. 35 No. 4 pp. 475-480

In one of these two cases the diagnosis was certain for measles were found in a piece excised from the left gastrocnemius in the other it was inferential.

The case histories are given in detail. There was the usual puffiness of the lids and tenderness of muscles with eosinophilia in both men. He in whom trichinae were found in the muscle had a positive precipitin reaction in a dilution of 1 in 1 600 and had skin test positive and 5 days before his illness began he had bought had himself imperfectly cooked and had eaten sausage meat. The other man had a history of eating cooked pork sausage a piece of excised gastrocnemius showed no trichinae skin test mildly positive precipitin test doubtful C. L.

PIERCE (G. N.) Jr & McNAUGHT (James B.) Effects of Alcohol on *Trichinella spiralis*—*Proc. Soc. Experim. Biol. & Med.* 1937 June Vol. 36 No. 5 pp. 579-581

We conclude that a concentration of 25 per cent. alcohol has little direct action on trichinella [larvae] *in vitro* but that concentrations as low as 9 per cent. interfere with the digestive liberation of encysted trichinella.

The liberal use of alcohol has been advised, with meat which may be trichinous as a means of preventing infection from its ingestion. To test the point two sorts of *in vitro* experiments were put through. In the first 5 grams from a quantity of ground up and thoroughly mixed trichinous rat meat and 100 cc. of artificial gastric juice were put into each of 6 beakers and to each beaker certain additions were made namely to No. 1 water 10 cc. to No. 4 ethyl alcohol 10 cc. to No. 2 water 20 cc. to No. 5 ethyl alcohol 20 cc. to No. 3 water 30 cc. to No. 6 ethyl alcohol 30 cc. From the controls, that is Nos. 1, 2 and 3 all the larvae recovered were free and alive and their numbers were 13 150, 13 550 and 11 500 respectively from Nos. 4, 5 and 6 none of the recovered larvae were active the recoveries from No. 4 were 7 080 dead from No. 5 were 400 capsulated and 3 600 dead (total 4 000) and from No. 6 were 790 capsulated and 1 860 dead (total 2 650). Alcohol then increasingly interfered with the liberation of the larvae by digestion. In the second set of experiments 1 000 larvae freed by gastric digestion were added to 2 cc. of ethyl alcohol in different dilutions, so that its strength varied from 25 to 0.1 per cent. After being at body temperature for 6 hours all larvae were held to be still living in all strengths of alcohol, that is they were active or tightly coiled and were not comma shaped. After 12 hours at body temperature all those in 25 per cent. alcohol were dead, after 24 hours all in 6.25 per cent. were dead, after 48 hours all in 1.5 per cent. were dead and at least half of those in lower dilutions. In the human stomach a strength of even 6.25 per cent. is not maintained for these long periods. C. L.

WANTLAND (W. W.) Blood Studies on Normal and Trichinized White Rabbits.—*Jl. Lab. & Clin. Med.* 1937 Oct. Vol. 23 No. 1 pp. 32-38 With 1 chart. [11 refs.]

Blood studies on a series of twelve trichinized rabbits revealed that a polycythemia occurring as early as the second week after infection,

closely paralleled by an increase in hemoglobin percentage and a rise in specific gravity occurred in seven of the twelve animals following infection with *Trichinella spiralis*

Hyper eosinophilia was definitely associated with marked symptoms of trichiniasis. A noticeable decrease in clotting time three to five weeks following infection and a definite erythrocytic macrocytosis (observed in most cases less than three weeks after infection) seemed indicative of trichina infection in the white rabbit

The production of toxins in the intestinal, blood and muscle phases of the disease very probably is one of the main factors concerned in the disturbance of the normal blood picture

C L

- 1 HINMAN (E. Harold) Filarial Periodicity — *Jl Trop Med & Hyg* 1937 Sept 1 Vol 40 No 17 pp 200-205 With 1 chart. [21 refs]
- 11 LANE (Clayton) Filarial Periodicity — *Ibid* Nov 1 No 21 pp 262-263

i. The problem of the mechanism of filarial periodicity is far from settled. In the case of *Dirofilaria immitis* the evidence points strongest to a continuous larval production but in *Wuchereria bancrofti* the experimental evidence must be considered inconclusive.

After pointing out MANSON'S statement regarding microfilariae in the blood. In the dog there is during the day a remission in numbers in man an intermission. Hinman adds. It seems evident that if a factor controlling periodicity can be determined in the filariae of the dog, then an important lead may be produced for studies on the human infection. After noting LANE'S papers favouring the view that in *W. bancrofti* there is simultaneously timed parturition of female worms and O CONNOR'S evidence in its support he adds —

Such a condition would explain filarial periodicity provided that, first, a comparable destruction of microfilariae occurs shortly after midnight and second that the female worms are capable of producing daily sufficient numbers of embryos to account for the enormous counts seen in many cases. To date there seems to be no evidence on this first proviso but the writer has information on the second matter concerning *Dirofilaria immitis* and this will be discussed below

The paper goes on to consider the second proviso. Taking microfilarial counts in 20 cmm. of blood estimating the quantity of blood as one twelfth of the body weight killing the dogs and counting the female worms in the heart and great vessels there was no correlation at all between the numbers of these and of larvae the variation being from 10 740 to 3 750,945 per female worm.

If cyclical parturition is responsible for periodicity in the dog heart worm then 50 per cent. of the maximum number must be produced anew each day and a corresponding number be destroyed every twenty four hours. That a single female *Dirofilaria* could daily produce even half of the above-mentioned numbers seems incredulous.

There is then cited an experiment by KNOTT [referred to as No 6 in LANE'S paper already quoted] as the most conclusive evidence against the short life of human microfilariae. Certainly if the embryos can survive up to two weeks following transfusion they probably do live much longer in their original host. What happens to over 90 per cent of the microfilariae immediately following transfusion remains a mystery. Then are described 12 of 62 experiments in which fertilized female dirofilariae were kept *in vitro* in saline or

outside Fukien Province. The examinations in Futang followed on the discovery of elephantiasis when R. C. ROBERTSON was investigating schistosomiasis there. Of the 268 examined 151 were patients and members of the staff of the Lucie F. Harrison Hospital, students of two middle schools and servants of these institutions while 115 were prisoners. There were infected with *W. bancrofti* 12 of the 151 (7.9 per cent) and 28 of the 115 (22.6 per cent). In one house there lived a man whose blood had 62 embryos in a thick film taken about 11 p.m. His mother too had embryos in the blood his wife and his daughter aged 12 had none. A week's collection made in that house each morning secured 15 *Culex fatigans* but it is noted that the door was kept open at night of these culex 5 were infected the larvae in 2 being still long and narrow in 1 sausage shaped and in 2 in the infective stage. Moreover in Lungtien there were 18 known cases of elephantiasis in a population of about 5 000 and 3 of 40 persons (7.5 per cent.) mostly patients and nurses at the Woolsten Memorial Hospital were infected with *W. bancrofti*. C. L.

LIU (Kusum) *Filaria*s in Changsha. Preliminary Report.—*Chinese Med J* 1937 Oct Vol 52 No 4 pp 579-582.

The parasite seen was *Mf. malays*.

Changsha, the capital of Hunan, has a population of about 300 000 a mean minimum temperature of 20°C or over for 5 months of the year and a mean relative humidity between 64.9 and 81.7. Examination was made of the centrifuged precipitate of about 1 cc. of blood after the latter had been mixed with 5 cc. of 2 per cent acetic acid. It was examined first unstained, and then dried and stained with methylene blue if there were microfilariae in it. The persons examined numbered 80 of whom 79 were unselected in-patients and 1 an attendant. 59 were males and 21 females. In this night blood *Mf. malays* was found twice once in a male and once in a female neither of whom had symptoms or signs of any kind. After the report was written the same parasite was found in a man who had elephantiasis of the scrotum. All persons were inhabitants of Hunan. The microfilariae were identified by L. C. FENG. C. L.

GALLIARD (H.) Distribution géographique de *Filaria malays* et de *Filaria bancrofti* au Tonkin. [Geographical Distribution of *F. malays* and *F. bancrofti* in Tonking.]—*Bull. Soc. Path. Exot.* 1937 July 7 Vol. 30 No 7 pp 573-577 [16 refs.]

In Tonking *Mf. malays* is about twice as common in the blood of filarial subjects as is *Mf. bancrofti*.

Of 1 613 persons examined, *Mf. malays* was found in 62 and *Mf. bancrofti* in 37. The percentages in different regions differed markedly being respectively 5.2 and 2.2 among 1 121 cases from the delta, 1.2 and 1.6 among 251 from the middle region, and 0.41 and 3.3 among 241 from the high region, *Mf. malays* being practically absent about Hanoi. The point is stressed that in elephantiasis of the lower limbs, *Mf. malays* was present in 20 per cent while *W. bancrofti* was always the only cause of urogenital lesions. C. L.

TANAKA (Shigeo) Investigations and Clinical Observations on Micro-malaria among Formosan Chinese in Boko Island.—*Taiwan Igakkai Zasshi (Jl Med Assoc Formosa)* 1937 Aug Vol 36 No 8 (389) In Japanese pp 1815-1824 With 4 figs on 1 plate 21 refs English summary p 1823

An examination of 229 male Formosan Chinese locally resident in Boko Island (Pescadores) leads to the conclusion that there is much infection with *Wuchereria bancrofti* on it and probably on the other islands of the archipelago and on the main island.

Signs of filariasis were found in 99 and microfilariae in 37 and of these last the English summary states that there was chyloceles in 7 inflammation of the testis and epididymis in 13 distension of the spermatic cord in 9 varicose groin glands in 1 and no physical signs in 7 a slight average increase of sedimentation rate a normal blood pressure an average erythrocyte count of 4,456,000 haemoglobin index 72 average leucocyte count 7,376 eosinophilia in 26 The presence or absence of other parasites is not noted in the summary C L

HI (Stephen M K.) Notes on the Filarial Infection of *Culex pipiens* var *pallens* Coq In Relation to the Microfilarial Density of the Blood.—*Lingnan Sci Jl* 1937 July 22 Vol 16 No 3 pp 409-413

The experiment consisted in feeding *Culex pipiens pallens* on two persons one having many the other few *Mf bancrofti* in the blood, and noting the numbers present in these insects on the fifteenth day.

Arranging the series in order of decreasing numbers of microfilariae in 20 cc of blood at the hour of feeding on 3 different days these numbers were 285 176 103 25 17 and 7 The percentages of mosquitoes which failed to become infective were respectively 12.5 0 40 42.9 56.4 and 77.7 of those which showed 1 to 9 larvae the percentages were 45 44.9 55 57.1 (1 to 4 larvae) 43.6 (1 to 4 larvae) and 22.3 of those showing 10 to 14 larvae 7.5 6.9 5 0 0 0 Only the mosquitoes fed on the blood containing 285 and 176 microfilariae to 20 cc of blood showed greater numbers the greatest being 80 in one mosquito for the first and 77 in another for the second series Again of 89 mosquitoes fed on the heavy filarial case 85.5 per cent. became infected 55.2 per cent harbouring 5 larvae or more while of 71 fed on the light case 40.8 per cent became infected and 1.4 per cent harboured 5 to 9 larvae C L

ABE (Shunichi) Investigations on the Biological Behaviour of the Mature Larvae of *Wuchereria bancrofti* developed in the Mosquito.—*Taiwan Igakkai Zasshi (Jl Med Assoc Formosa)* 1937 Sept Vol 36 No 9 (390) [In Japanese pp 2083-2102. [37 refs.] English summary pp 2102-2103]

"A study was made of the biological behaviours of the mature larvae of *Wuchereria bancrofti* that had undergone full development in the formosan breed of *Culex quinquefasciatus* (C. fatigans) The method adopted followed closely that used by Wakeshima (1933) in his studies on tropism of the mature larvae of *Ancylostomidae* A number of interesting results were obtained which are summarised below

"The life of the mature larvae was comparatively long when left at generally low temperatures and in a closed place in other environments its

life was shorter. It lived longest, 37-58 hours, when placed in normal saline but was extremely sensitive to drying and usually died in 1-2 minutes under such conditions. Its viability in different media including various fruit juices" are given in a table. "*Thigmotaxis* was not exhibited by this larva. At low temperatures *negative phototaxis* was well marked, but when left at a temperature of 37-40°C. for one to one and a half hours, an opposite attitude was taken, and *positive phototaxis* was demonstrated. There was no evidence of marked *thermotaxis*. *Hydrotaxis* could be demonstrated. It is not made clear how a tropism to water can be tested in an animal already living in a watery fluid. *Chemotaxis* for human blood and canine tissue fluid was not easily shown and was often overlooked. For oxygen and human bile there was definitely no evidence of *chemotaxis*." C. L.

JOYEUX (Ch.) & SAUTER (J.) Contribution à l'étude de la culture des microfilaires. [The Culture of Microfilariae.]—C. R. Soc. Biol. 1937 Vol. 128 No. 26 pp. 361-362.

*Microfilaria immitis* grows in length in favourable artificial media. The authors first note the different lengths given for these microfilaria by different workers and point out that these differences are probably due to changes caused in preparation of microscope slides.

Survival for an average of 12 days took place in a mixture of the serum of a dog parasitized with *Dirofilaria immitis* and its total blood haemolyzed with distilled water. During the first 6 days there was an increase in the maximum length of embryos measured without being fixed from 280μ to 442μ though when these latter were fixed in formal the maximum at six days was 377μ, and when seen in a thick drop 395μ. The growth had nearly reached its maximum in 3 or 4 days. There is no increase in breadth and no differentiation of organs. The laboratory temperature of one of 4 to 8°C. seemed to make no difference to growth and the lower temperature seems that it does not favour bacterial growth was a real advantage. The use of the serum of a pregnant mare was of no advantage and Row's medium unheated, and horse serum were less successful. [Is not then the absence of such large forms in circulating blood presumptive evidence of the rapid destruction of microfilariae by the host's body?] C. L.

MONTESIEUX (E.) & BERTRAND (Ch.) Note sur l'étiologie et le traitement de la lymphangite tropicale. [Cause and Treatment of Tropical Lymphangitis.]—Bull. Soc. Path. Exot. 1937 Oct. 13 Vol. 30 No. 8 pp. 695-698.

Two cases of lymphangitis are described both seemingly at Albert-Clarac.

One ended in suppuration at the apex of Scarpa's triangle on the right side the abscess yielding both *Mf. bancrofti* and streptococci; the man had also acute funiculitis. The second had monthly attacks of lymphangitis in upper and lower limbs and breast. Apparently neither had elephantiasis, and no mention is made of microfilariae in their blood. It is thought that benefit was got from antistreptococcal vaccine in one but not from antistreptococcal serum in the other. In the second Rubiazol and Septazine were used in treatment.

C. L.

GORTER (A. J.) De operatieve behandeling van elephantiasis der onderste extremiteiten [Operative Treatment of Elephantiasis of the Lower Extremity —*Geneesk Tijdschr v Nederl Indië* 1937 May 18 Vol. 77 No 20 pp 1236-1242 With 4 figs. on 2 plates

The object of treatment must be to remove superfluous tissue along with excessive fluid and to ensure the restoration of lymph flow. In general enlargements of the lower extremities constrictions of the swelling are found at the popliteal space and at the ankle. The surface of the skin is apt to be fissured and ulcerated. Preliminary treatment is absolutely essential. The limb is raised and the surface lesions are treated. This will take at least 10 days. Skin grafting and excision of an ulcer may be necessary. The results of this treatment are usually remarkable. All this time the patient must be strictly confined to bed. Operation is performed in one stage only by the removal of elliptical portions of skin from the buttock fold down to the ankle. Two ellipses are required because of the narrowing of the general enlargement at the popliteal space one above and one below. Careful measurements are to be made on the normal limb in order to judge how much to cut away or rather how much to leave behind for the fashioning of a new limb. Obviously any normal skin remaining will be spared for this purpose. The operation requires general narcosis and a rubber tourniquet is applied as high up the limb as possible. Undercutting of the skin may be required and this can be done with safety on both sides to the extent of 10 cm. Severe shock has not been found to occur as the result of the operation. The after treatment is just as important as the preliminary treatment. First and foremost the limb must again be elevated but bandaging of the limb is not in the first place desirable in case of hindrance to the circulation. Movements of the foot should be early encouraged and after a few days some movement at the knee may be begun. No fixation of skin to muscles has been observed after operation. Stitches may be removed on the 9th day and if no complication has occurred the patient may be allowed up on the 14th day. He must now wear a supporting elastic bandage to the whole limb. On retiring to bed the limb must again be elevated which may be done with the help of a sufficiently high cushion.

The results have been gratifying. No sign of oedema of muscles appears and a satisfactory lymph flow appears to become established. Patients have been observed for as long as 2½ and 5 years and their satisfactory condition has been maintained. W F Harvey

TREW (Harbans Singh) Guinea-Worm.—*Indian Med Ga* 1937 Oct Vol 72 No 10 pp 606-609

A paper written on an experience of 526 guineaworms removed during 3 years.

An editorial note points out that while it does not contain anything particularly original the paper does show how the infection may be dealt with in an ordinarily equipped hospital. Points of more general interest are the appearance of a guineaworm in a convict of 15 years standing the presence of 56 worms in one person at the same time a seasonal incidence the importance of the step well in the causation of the infection with instances where infection ceased

when a covered well took the place of these tanks the immunity of some to infection although they are using the same sources of water as do others who get a yearly infection the injection of 1 in 1000 corrosive sublimate solution into the worm itself with a dressing over the sore of the same solution is highly thought of C L

KOFOID (Charles A.) WILLIAMS (Owen L.) & VEALE (N. C.) *Thelazia californiensis* a Nematode Eye Worm of Dog and Man, with a Review of the Thelazias of Domestic Animals.—*Univ California Public Zool* 1937 Vol 41 No. 17 pp. 225-233 [30 refs.]

A redescription of *Thelazia californiensis* based on specimens from dogs. In them measurements are on the whole larger than from worms parasitizing man. Transmission experiments with cockroaches, or by feeding the larvae to dogs or instilling larvae into their conjunctival sacs were negative. The adults rapid movements make their removal from the conjunctiva a difficult matter C L

HABERT (M.) *Fievre jaune et tétrachlorure de carbone* [Yellow Fever and Carbon Tetrachloride].—*Bull Soc Path Exot* 1937 July 7 Vol 30 No 7 pp 598-601

The record of two patients who after taking 3 cc. of carbon tetrachloride both showed symptoms closely simulating yellow fever in one case even developing "black vomit"

A third (fatal) case is discussed in which the histological examination of the liver resulted in a diagnosis of toxic infection hepatitis of yellow fever type. It was found that this patient became ill immediately after taking a dose of carbon tetrachloride

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## MEDICAL AND SANITARY REPORTS

## SUDAN (1936)

The Sudan is bounded on the north by Egypt, east by the Red Sea, Eritrea and Abyssinia, south by the Uganda Protectorate and Belgian Congo, west by French Equatorial Africa. Its western and northern frontiers meet in the Libyan desert. The greatest length north to south is approximately 1,300 miles and from east to west 1,200 miles. Its total area is about 1,008,100 sq. miles.

*Vital Statistics*—For previous observations under this heading the reader is referred to this *Bulletin* 1936 Supp. pp 90\*-92\* and 1937 Supp. p 100\*-101\*. Population figures are to be regarded as only rough estimates and as such are of very limited value in the determination of birth and death rates. The distribution of these estimated populations reads as follows—

Province	Approximate Population	Province	Approximate Population
Blue Nile	809,599	Kordofan	1,222,729
Darfur	751,528	Northern	508,037
Equatorial	1,051,059	Upper Nile	336,647
Kassala	409,355	White Nile	389,347
Khartoum	267,183		
		Total	5,944,477

At present no machinery exists whereby accurate vital statistics can be assembled, but the Report presents data for Khartoum and Blue Nile Provinces Berber Blue Nile Dongola and Wadi Halfa Districts births stillbirths and deaths with distinction as to sex, and deaths in age groups. Summarizing these facts we have—

Nationality	Births	Stillbirths	Deaths
Europeans	28	1	29
Sudanese	18,525	489	10,506
Egyptians and Syrians	267	7	57
Others	331	3	439
Totals	19,169	500	11,031

The following facts are also given for non-Europeans—

Area	Births	Birth Rate	Stillbirths	Stillbirth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Khartoum Prov..	4,223	15.8	118	27.9	2,650	9.9	263	62.7
Berber Dist. --	3,837	20.3	116	30.2	1,828	10.2	205	53.4
Dongola Dist.	5,024	26.2	156	31.0	2,530	13.2	232	46.1
Blue Nile Dist. --	4,906	11.6	81	16.8	3,233	7.8	164	34.1
Wadi Halfa Dist.	1,253	18.9	28	22.3	624	9.4	73	56.2



[It is presumed the stillbirth rates are calculated per 1 000 live births. With reference to birth and death rates see this *Bulletin* 1937 Supp. p. 101\*]

*Government Officials* of British nationality numbered 820 two were invalided and two died during the year. Other Government Officials employed were, *Sudanese* 3,836 with 4 invalidings and 14 deaths. *Egyptians* 537 2 invalidings 4 deaths. *Syrians* 49 no invalidings or deaths.

The average annual strength of the *Sudan Defence Force* was 4 440. During the year 3,669 N.C.O.s and men were admitted to hospitals suffering from various forms of disease. *Malaria* headed the list with 977 cases—most of these occurring among troops operating in unhealthy areas along the eastern boundary. *Wounds and injuries* follow next in order with 708 cases attributable to extensive movements of troops and increasing mechanization of equipment. *General diseases* were responsible for 508 cases of which 278 were due to *gonorrhoea* 183 to *syphilis* and 40 to *soft chancre*.

*Maternity and Child Welfare Work*—Valuable work highly appreciated by all classes of the population continues to be carried out at established clinics (see this *Bulletin* 1937 Supp. p. 101\*). It is noted that of the 9 085 attendances recorded at clinics in Khartoum Province 2,826 related to new cases. The returns of the Civil and C.M.S. hospitals, the Medical Training School, and trained midwives in Omdurman (from the latter source data for the first half of the year only) show that 1 109 women were treated for diseases of *pregnancy childbirth etc.* and 11 died and of 1 018 births recorded 977 were live births. Hospital returns also show that 646 gynaecological and 446 labour cases were dealt with 642 of the former and 425 of the latter relating to non-European women among the 425 native labour cases 22 deaths were registered.

At the *School of Midwifery* Omdurman 25 pupil midwives completed their training and passed the qualifying examination while 5 trained midwives attended revision courses. Of the 269 midwives trained at this *School* during the past 16 years 224 are still in practice in various parts of the Sudan their inspection is carried out regularly by the Inspectress and Matron of the *School*. So successful has the work proved that there is an increasing demand on the part of Sudanese women to be delivered in hospital or to be attended by a trained midwife. The stage has been reached when the work of the *School* is to be supplemented by the establishment of a subsidiary centre at Juba in the Southern Sudan.

*School Hygiene*—It was found possible to extend the work of the *School Medical Service* in most provinces of the Northern Sudan more attention was also paid to village schools especially with a view to the earlier treatment of trachoma and other eye conditions. During the year 21 041 children were examined *trachoma* remains the major cause of disability in the North and *malaria* in the South. No case of *pulmonary tuberculosis* was discovered. A year ago in these pages it was noted that the percentages of children affected by *trachoma* varied between wide limits not only as between Province and Province but even between Districts in the same Province. These variations continue the lowest recorded percentage is of 1.8 for a school in Khartoum Province and the highest 91.3 for one in White Nile Province. In Khartoum Province out of 2,814 children examined, 1 055 were suffering from trachoma and among 1,250 pupils there were

233 cases of defective vision. Routine treatment of trachoma has proved most effective. Incidence of the disease among pupils of the Gordon Memorial College declined further to 21.7 per cent (see this *Bulletin* 1937 Supp. p. 102\*). As regards malaria incidence among school-children, rates—which are given for various Districts in the nine Provinces—range from 0.7 per cent in Wadi Halfa in the Northern Province to 47.2 per cent at Fung in the Blue Nile Province. It is pointed out that while in the Northern Sudan the figures provide fairly accurate indices of malaria endemicity in the Southern Provinces where schools are few, the data may prove misleading.

*Public Health Sanitation etc.*—The epidemic of cerebrospinal meningitis which continued from 1935 and spread to every Province in the Northern and Western Sudan adversely affected the state of the public health during the year under review. Moreover in the Northern Sudan the rains were heavy, late and badly spaced and these together with the irregular fall of the Nile and formation of residual pools provided conditions favourable to mosquito breeding with the result that malaria incidence was considerably higher. Though these developments heavily taxed the resources of the public health staff in towns and in most Provinces. In Dongola good progress was made in the provision of properly constructed *pit latrines* in private houses while in the smaller towns with the appointment of qualified sanitary overseers health organizations were established where hitherto sanitation was perfunctory or absent.

Though no new purification plants or piped water supplies were installed during the year projected schemes for Wadi Halfa, Malakal and Torit are being considered. The routine examination of established supplies continued to give satisfactory results (see this *Bulletin* 1937 Supp. p. 102\*).

The question of housing improvement received special attention for the epidemic of cerebrospinal meningitis again emphasized the importance of overcrowding as the main factor in the spread of the disease. In the Northern Sudan steady progress is reported in the clearing of insanitary and overcrowded areas and the construction of an improved type of dwelling. A committee was appointed to consider the best types of native houses from the economic and hygienic point of view.

The six Sudanese Sanitary Officers are proving a valuable addition to the public health service. It is intended to post at least one such officer to each province where British staff is not available. Sanitary Overseers (see above) undergo a course of instruction in Khartoum during the year 36 candidates qualified and were posted to various towns and districts.

*Training Medical etc.*—To the Kitchener School of Medicine 10 new students were admitted, and there are now 24 medical and 6 sanitary students on the registers. Six out of seven medical students were successful at the Final Examination and will be posted to the larger hospitals for one year on probation. In the course of training for Assistant Medical Officers—who in outlying districts where no sanitary staff are available are responsible for public health work—instruction is given in the principles of hygiene and sanitation.

*Port Health Quarantine etc.*—Ships entering Port Sudan numbered 1,604. None was quarantined but 3 persons from ships were isolated during the year. Quarantine restrictions for cholera were enforced at (197).

times during the year against ships arriving from Siam and Ceylon, for smallpox against vessels from Bombay and Karachi, and for plague against ships from Karachi. The *Snakin Quarantine Station* dealt with 3 404 pilgrims—all were vaccinated and received one inoculation against cholera. 151 were admitted to hospital and 7 died. At Wadi Halfa 1 152 Egyptian labourers passed through the quarantine—none were repatriated as unfit though 66 were found to be infected with bilharzia and were treated.

All *aircraft* arriving at, or departing from frontier aerodromes are inspected and disinfected during the year 2 371 machines were dealt with at five aerodromes. All mosquitoes captured are identified by the Medical Entomologist and a record kept of their probable port of origin.

*Hospitals Dispensaries etc*—With the completion of the new Omdurman Hospital it is believed that hospital facilities—providing approximately one bed per 1 000 population—will be as adequate as can be supervised and maintained efficiently. Future aims will be directed towards the provision of X-ray sets, better laboratory equipment, etc. and to raising the standards of efficiency of the subordinate staff. There are now 337 dispensaries established in various parts of the Sudan—no appreciable increase in their number is envisaged in the near future.

There appear to be 6 *Mission Hospitals* of which 4 are maintained by the Church Missionary Society—one by the Sudan United Mission, and one by the American Mission. Of *Mission Dispensaries* there are 12, viz., Sudan United Mission 6 Italian Mission 3 American Mission 2, and Church Missionary Society 1. Work accomplished at Government and Mission treatment centres during the year may be set out as follows—

Item	In-patients	Deaths	Out-patients
40 Government Hospitals, and 337 Government Dispensaries	96 081	2,306*	6,500 441
6 Mission Hospitals	1,960	—	113 434
1* Mission Dispensaries	—	—	50 194†

95 620 of the in-patients and \* 294 of the deaths relate to non-Europeans

† Data are supplied for two Dispensaries only

*Courses of training* are organized for Assistant Medical Officers, Dispensers, Hospital Orderlies Hospital Nurses, and other categories of medical and sanitary personnel (see also *Training Medical etc* above).

The notes which follow briefly summarize the more important items of 1936 morbidity experience commented upon in the Report under review—

*Malaria* remains the most important public health problem with which the Sudan authorities have to deal, for though the disastrous epidemics of past experience no longer sweep the country, much disability and loss of life are still attributable to the disease. Mention has already been made of the factors responsible for considerably increased incidence experienced during the year. In certain parts of the Northern Province the disease assumed almost epidemic proportions, but it is observed that in the Southern half of the Province

where sanitary services have recently been reorganized and strengthened there was no epidemic malaria despite adverse climatic conditions.

According to official returns at Government institutions 189,713 cases of the disease were dealt with and of this total 10,310 of the patients received in patient hospital treatment and 74 died. Of *blackwater fever* 38 cases were reported with 14 deaths the racial distribution being Arab Sudanese 24 cases 11 deaths the racial Sudanese one non fatal case British 3 cases 1 death other races 10 cases 2 deaths.

The distribution of spleen rates among school-children is briefly referred to in the Section *School Hygiene* above. It remains to add that *subtertian* malaria appears to be the prevailing infection. In the Blue Nile Province blood films examined for the presence of malaria parasites contained 1,790 *P. falciparum*, 194 *P. vivax* and 65 *P. malariae* while at the Stack Medical Research Laboratories in 1,006 blood films examined the corresponding findings were 133 41 and 2 respectively.

Anti-malarial work is being extended but outside the towns little can be done in this direction owing to the prohibitive cost of effective measures. In these circumstances protection of the individual both in urban and rural areas is aimed at as the principal measure of defence (see also under *Scientific* below).

The epidemic of *cerebrospinal meningitis* (see *Public Health* above and this *Bulletin* 1936 Supp. p. 96\* and 1937 p. 104\*) continued to rage with increased severity. During the year under review 13,440 cases and 8,906 deaths were recorded or four times the number of cases and deaths recorded in the preceding year. morbidity and mortality due to this disease were greater than any experienced during the past seven years. All provinces were affected—Darfur Province had 8,833 cases and 6,158 deaths Kordofan Province 2,293 cases and 1,338 deaths while at the other end of the scale were Port Sudan and Suakin 3 cases 2 deaths and the Equatorial Province one fatal case only.

Despite every effort to localize the epidemic the disease spread rapidly during the first six months of the year finally dying away with the beginning of the rains. The only effective prophylactic measure under field conditions was the evacuation of villages to specially constructed shelters in the open country—where possible a separate shelter was constructed for each person (see this *Bulletin* 1936 Supp. p. 96\* and 1937 Supp. p. 104\*). No curative measures that are possible on a large scale have yet been evolved—anti-meningococcal serum was used in a number of cases but results were not encouraging.

At the Stack Medical Research Laboratories local strains of meningococci were isolated and examined with results that were confusing. It is stated that in view of this antigenic overlapping it seems distinctly unlikely that the group sera at present issued from the Standard Laboratory are likely to afford any help in an antigenic classification of strains in the Sudan or act as a guide to specific serotherapy, and again there has been no clear evidence that the polyvalent serum used in a number of cases in 1936 had any specific influence on the infection. [In the 1935 Report mention was made of experiments being conducted by Dr N. L. CORRELL with Vitamin A extract as a prophylactic results were said to justify further experiment (see this *Bulletin* 1937 Supp. pp. 104\*–105\*)]

Area	Number Examined	Number Infected	Percentage
Northern Province (2 Districts)	57,334	1,266	3.4
Wadi Halfa District	12,437	1,430	12.9
Blue Nile Province	28,067	27	0.09

*Dracontiasis* continues as a cause of considerable disability in the Southern Sudan and in the Nuba Mountains. In the former area special wells are being constructed to reduce the incidence but in the Nuba Mountains the situation is more difficult owing to the existence of numerous infected pools in the hills. It is noted that of 3,716 cases treated in all areas during the year 3,225 were in the Equatorial Province. *Ankylostomiasis* is said to occur only in a few isolated areas in the Northern Sudan, and that measures taken to prevent the introduction of infection have reduced incidence to negligible proportions. In the Equatorial Province the disease is widely distributed on the Western side of the White Nile but is rarely met with on the east of that river.

*Leprosy* is believed to be well under control throughout the Sudan where it is estimated there are 10,495 lepers with 7,933 of them in the Equatorial Province alone. At the end of the year there were 2,550 lepers in camps or settlements and 889 under observation or treatment. The system of home isolation at present carried out in the Northern Sudan is said to work well while in the Southern Sudan where the incidence is higher settlements have been established near dispensaries and have functioned satisfactorily. It is only in the southern districts of the Equatorial Province that leprosy is a menace and there both the large and small settlements function as satisfactorily as can be expected.

Extracts are again given from the Report of Dr. WOODMAN, Senior Medical Inspector, La Rangu (where one of the big leper settlements is established) in the Yambio District. Among other matters he states that there are 3,648 known lepers in the Yambio sub-district and approximately 850 in the Meridi and Ibe sub-districts and that the conclusions reached and described in the preceding report still hold good (see this *Bulletin* 1937 Supp. p. 107\*). From among relapsed cases, and those having persistently declined in spite of previous treatment, selected groups have been given experimental courses of treatment with various dyes so far without evidence of permanent benefit from their use.

Of *venereal diseases* it is stated that little change in their incidence can be reported. The investigations of the Obstetric Surgeon continue and show that the incidence of *syphilis* among pregnant women though high is not a common cause of abortion. Among 40 cases of abortion 38 were Kahn tested and only 5 or 13 per cent reacted positively. [It is regretted that in the preceding issue of this *Supplement* it was stated in error that 94 per cent. of tested cases reacted positively in 1935; actually the proportion was 9.4 per cent.] During the year Port Sudan was notified internationally as a port at which sailors could obtain free V.D. treatment in accordance with the terms of the Brussels Convention. The incidence of yaws is said to have been reduced to negligible proportions except in the extreme south.

The Report under review which states that 77 571 cases of *syphilis* and *yaws* were treated during the year also contains the following —

Disease	Hospital In patients		Sudan Defence Force N C O'S and Men.
	Europeans	Non Europeans	
Syphilis	—	11 157	188
Gonorrhoea	1	2,285	278
Soft Sore	2	495	42
Yaws	—	844	2

Other diseases include mention of 89 cases of *scurvy* with 2 deaths 7 of *beriberi* and 3 of *pellagra*. Dr H. A. CROUCH reports that there is reason to believe that in many areas the population exist in a state of subnutrition. *Tumours* were responsible for 758 cases of which 192 were malignant and the cause of 42 deaths. At the Stack Laboratories among 140 pathological specimens received 104 were defined as malignant tumours. Any attempt to analyse details with distinction as to age and sex would be misleading—in most cases age is not given and fewer women than men submit to operation for neoplasms. *Hydatid disease* which appears to be confined to the Tapanin tribe round Kapoeta caused 10 cases while of *acuthe rheumatism* 288 cases and 5 deaths were reported with the greatest incidence in the Northern Kordofan Blue Nile Khartoum and Kassala Provinces.

*Scientific*—Under various headings in the preceding notes mention has been made of the various specimens received for examination in the Stack Medical Research Laboratories and of the findings recorded. It remains to say that during the year under review examinations of all kinds totalled 18 041 with among them a considerable increase in the number of routine Kahn tests (exclusive of those carried out at the Port Sudan Hospital Laboratory) viz. 11 490 as compared with 9,320 in 1935. Tallqvist's method of haemoglobin estimation has been abandoned the Sahli Hellige Haemoglobinometer adopted and this apparatus issued to six of the large hospitals the technique of the use of the latter instrument is now taught as a standard method to all assistants under training. The *yellow fever* investigations continue (see this Bulletin 1937 Supp. p 109\*) the work including examination of liver sections from fatal cases of pyrexia of obscure origin mouse protection tests with sera collected from the natives of the Eluri district of the Nuba Mountains (results indicating a widespread infection of the virus of yellow fever in that area during the last 20 years) and similar tests with sera obtained from monkeys and cows. These investigations will be extended to include the sera of other domestic and wild animals. Other work included the preparation of vaccines experiments carried out with strains of seed lymph received from Lagos and from the Government Lymph Institute Colindale. These experiments and the results obtained are described in some detail.

The Government Entomologist contributes a separate report of the activities of his department. This included surveys of insects of medical importance the collection and identification of insects from aeroplanes experimental work concerned with determining the efficacy of stocking pools with *Gambusia affinis* for the control of mosquitoes. Results which are to be embodied in a paper for

publication suggest that this species of fish is not effective for the purpose in artificial pools in urban areas. A detailed account of a survey of anophelines in the Gezira Irrigated area is supplied. *A. gambiae* was found to greatly outnumber other species and is the only proved vector of malaria in the area. The Report concludes with reference to the use of larvicides, methods of trapping adult mosquitoes and the occurrence of mosquitoes other than anophelines.

P. Grassie Edge

### NORTHERN RHODESIA (1936).

Northern Rhodesia lies north of the Zambesi River with Tanganyika Territory and the Belgian Congo to the north, Nyasaland and Portuguese East Africa on the east, Southern Rhodesia and South West Africa on the south and Portuguese West Africa on the west. The area of the Territory is estimated at about 287,950 sq. miles and divided for administrative purposes into nine Provinces.

**Vital Statistics**—Though estimates of the native population were made for each of the years 1930-34 in the Report under review it is stated "There is probably justification for saying that the native population numbers something over a million and a quarter beyond that I would not venture to go and as no figure is obtainable for total births or total deaths that could be regarded as even approximately reliable no attempt has been made to calculate rates (See also this Bulletin 1937 Supp. p. 78\*).

Knowledge of the European population is also conjectural. An estimate of 14,000 is stated to be "little more than a guess and does not justify the calculation of birth and death rates.

On the assumption that European births are correctly and fully registered there were recorded 313 and of European deaths 78. *malaria*, *blackwater fever* and *accidents* were among the principal causes of death. There were six European infant deaths.

European Officials resident numbered 611 with an average number resident of 536. the corresponding figures for Native Officials were 2,550 and 2,376 respectively. There were no invalidings or deaths among European Officials but 25 Native Officials were invalided and 13 died during the year under review.

**Maternity and Child Welfare Work**—At European Hospitals 185 women were treated as in-patients for *diseases of the puerperal state* 142 being cases of normal labour. at Native Hospitals the corresponding figures were 107 and 56 respectively. The addition of a maternity section separated structurally from the main building is a necessity at the Lusaka Hospital.

The four *Welfare Clinics* were maintained (see this Bulletin 1937 Supp. p. 79). The only records of work presented in the Report relate to two of these Clinics viz.—

Clinic	Europeans		Natives		
	Patients	Attendances	Men	Women and Children	Attendances
Lusaka	179	354	2,425	4,335	30,979
Ndola	142	4,771	1,347	4,691	28,173

Reference is made to the large volume of successful welfare work carried out by the three copper mining companies a nursing sister and subordinate native staffs are employed by each of these concerns for work among the dependants of mines native employees

*School Hygiene*—Government Medical Officers inspected all European Schools and scholars twice during the year a good deal of evidence of malnutrition was noted together with numerous cases of enlarged tonsils. Organizations for arranging seaside holidays for children are established in Ndola and Lusaka and have operated with great success. Dental inspections of school-children are made twice yearly but the complaint recurs that in too many cases parents fail to have remedied the defects discovered (see this *Bulletin* 1937 Supp p 80\*) In all schools both native and European lessons in hygiene are given and the subject is an item in the syllabuses of teachers in training

*Public Health Sanitation etc*—Dr J F C HASLAM observes that financial considerations again prevented any increase of staff either by way of restoration of officers retrenched in 1933 or otherwise and that in consequence the pressure of work has so taxed the energies and resources of medical officers as to give rise to no little concern Provision made for the medical care of the native population is inadequate of the 12 medical officers stations established in an area larger than France as 10 are sited primarily in European interests it is obvious that considerable aggregations of natives must be beyond the reach of medical aid.

Though available statistical information regarding the general health of the population is negligible as to quantity and unreliable as to quality it is believed that no notable improvement or deterioration in the public health occurred during the year under review. Apart from a staff of medical officers too occupied with clinical duties to be able to give much time to preventive work the Department had three Health Inspectors (one on leave during the year) whose primary duties were concerned with the organization and implementation of preventive measures. Having regard to the very considerable shortage of staff and money but little could be accomplished despite the evident determination on the part of all concerned in their struggles to make a shilling do a pound's work. In the chief centres of *European population* it is claimed that fair standards were maintained with respect to *disposal of excreta and rubbish water and food supplies* and the prevention of the grosser forms of nuisance. In the previous Annual Report it was stated that the water supply of Lusaka was adequate in quantity. Dr HASLAM observes that the storage capacity of the tanks is however deficient.

During 1938 organized recruiting of labour for employment in the Rand mines increased and a considerable stream of natives leaves voluntarily for employment outside Northern Rhodesia. The conditions under which native labour is employed at the three large copper mines and at Broken Hill mines are excellent employees of the Zambesi Saw Mills Limited are less adequately dealt with but conditions are described as fair and in process of improvement. The medical care of employees in agriculture is inadequate (see this *Bulletin* 1937 Supp p 80\*) The housing of agricultural labourers hardly anywhere attains the standards legally prescribed and on many farms is described as frankly bad. It is also observed that the



accommodation provided for servants of Government officers in Livingstone is unsatisfactory in many cases.

Under the heading of *Food in Relation to Health and Disease* observations remain as previously described (see this *Bulletin* 1937 Supp. p. 81\*) It is noted that a committee has been appointed to report on nutrition in the Territory.

*Training of Sanitary Personnel*—The first training school for African Medical Staff in Northern Rhodesia was opened on the 1st October 1936 and 24 pupils able to read, write, and speak some English were enlisted mostly from Mission Schools. As soon as it becomes practicable to extend the scope of the present teaching which is confined to the training of hospital assistants the training of Africans as sanitary inspectors will be undertaken.

During the year under review *Ordinances and Regulations* enacted in the interests of *Public Health* had reference to such matters as *building drainage* and *latrines*, *sale of bakery products*, *ice*, *aerated waters*, etc.

*Recommendations* submitted to Government have reference to the staffing of the Medical Department, medical arrangements at Broken Hill, and reorganization of the present system for the distribution of medical stores and equipment.

*Port Health Work* remains as previously described (see this *Bulletin* 1937 Supp. p. 81.)

*Hospitals, Dispensaries, etc.*—No additional hospitals were built and no existing hospitals were replaced by new buildings (see this *Bulletin* 1937 Supp. p. 81\*) though minor improvements were carried out at several institutions. At Lusaka the new hospital needs a separate building for maternity cases and new premises for isolation purposes. The native hospital at Abercorn remains housed in a building condemned as a goal [the Report says "condemned as a goal"] seven years ago while the native hospitals at Fort Jameson and Lusaka are dark, unsuitable and inconvenient and stand in need of replacement. Application has been made to the Colonial Development Committee for financial assistance for the improvement of medical services. Government maintained 18 *rural dispensaries* staffed by native orderlies, some of them can accommodate a few in patients (see also this *Bulletin* 1937 Supp. p. 81.)

The *Mining Companies* continue to maintain admirably staffed and equipped European and native hospitals while various *Missions* subsidized by Government to the extent of £3 050 do valuable medical work in outlying districts.

The work carried out at the various hospital centres may be set out as follows—

Institution	In-patients			Out-patients
	Admitted	Treated	Deaths	
<i>Government Hospitals—</i>				
7 European	1,632	1,691	23	?
12 N. b.	10,009	10,700	402	52,151
Dispensaries	—	1,534	—	24,160
<i>Mining Companies</i>	6,571	?	95	?
<i>Missions</i>	No details supplied.			

It is observed that though hospital figures show a steady increase in the volume of work the latter is not indicative of increased morbidity but of increased confidence in and use of facilities available

*Malaria* continues to be the chief cause of sickness among Europeans during the year 486 admissions to European hospitals were recorded and 493 cases were treated with 2 deaths. All were subtertian infections. To hospitals for natives there were 1 067 admissions 1 088 cases treated and 25 malaria deaths registered here also all were subtertian infections. Of *blackwater fever* 14 cases among Europeans with 2 deaths and 2 non fatal native cases were recorded. It is stated that European cases of blackwater fever occur mainly among members of the poor Dutch farming community where standards of living and nutrition are very low

*Malaria* was very prevalent in the new capital of Lusaka during the early months of the year. Steps were taken to drain the only permanent anopheles breeding place dangerously near the new township. Prison labour was employed with success. It is believed that an appreciable reduction in Lusaka malaria rate may be expected to follow completion of this work. As regards general anti-malarial works it is noted that the approved estimate for such services amounted only to £915

Among the *notifications of infectious diseases* received were 22 European cases and 4 deaths due to *blackwater fever* (see above). Also there were 9 European and 24 native non fatal cases of *typhoid fever*. Hospital Returns quote 9 European cases of *typhoid* 3 of *paratyphoid undefined* and 6 native cases of *typhoid*. Notified cases of *dysentery* among Europeans numbered 24 of which 14 were amoebic 3 bacillary and 7 undefined all were non fatal. Among natives there were 194 cases with 3 deaths distributed as to 38 amoebic 17 bacillary and 139 undefined.

*Smallpox*—No case of *variola major* was reported but a small outbreak of *variola minor* occurred in the Mazabuka District where 96 cases were recorded with no mortality. 10 712 vaccinations were performed. No case of *plague* was recorded (see this *Bulletin* 1937 Supp p 82\*) *Cerebrospinal meningitis* gave rise to 15 native cases with 8 deaths 8 of the cases receiving in patient hospital treatment with 7 deaths.

Notified cases of *relapsing fever* are said to have totalled 186 (see this *Bulletin* 1937 Supp p 82\*) All were native cases and one death only was ascribed to this cause. It is noted that 21 cases were reported from Kasama 77 from Mongu and 90 from Fort Jameson making a total of 188.

*Influenza* was less prevalent and less virulent in type than in the preceding year. Four cases among Europeans and 698 among natives were notified with 78 deaths among the latter. Though several small epidemics of *measles* were reported fewer cases were reported and mortality was less severe among children. There were 128 non fatal cases among Europeans and 224 among natives with 16 deaths. Of *scarlet fever* 9 non fatal European cases were notified 30 cases of *whooping cough* among Europeans and 94 among natives 8 European cases of *diphtheria* (one death) and 2 native cases.

Of *trypanosomiasis* the Report records 28 notified cases among Europeans and none among natives though five deaths of natives were ascribed to the disease (see this *Bulletin* 1937 Supp p 83\*)

Dr Haslam states that evidence is accumulating to show that *tuberculosis* is more prevalent than has been supposed. During the year under review 8 Europeans and 83 native cases of the disease (all forms) were notified. Of these totals *pulmonary tuberculosis* was responsible for 2 of the European cases with 1 death and for 75 of the native cases with 16 deaths. *Pneumonia* continues to menace the health of the native population at Government native hospitals where 351 cases of the disease were treated with 100 deaths, 119 of the cases and 36 of the deaths were due to *lobar-pneumonia* while unclassified pneumonias were responsible for 188 cases and 47 deaths.

With regard to *helminthic diseases* it is stated that increasing information shows these diseases to be more prevalent than was realized (see this *Bulletin* 1937 Supp. p. 83\*). Hookworm infection is widespread but not severe. Medical Officers report the finding of ova by routine stool examinations in cases showing no symptoms of infection. *Schistosomiasis* both urinary and intestinal is common in some areas. Hospital Returns show 3 cases of *ankylostomiasis* among Europeans and 169 among natives. 11 natives treated for *S. haematobium* 86 for *S. mansoni* infections.

Reported outbreaks of *rabies* among jackals and dogs occur every year and give rise to anxiety and increasing expenditure upon vaccine for the protection of contacts. During the year under review 44 outbreaks were reported, 21 being experienced in Mazabuka alone.

*Veneral Diseases*.—Facilities for treatment remain as described in these pages a year ago. *Syphilis* continues to be as prevalent as ever in the Namwala District where there is no resident medical practitioner either Government or Missionary. Medical Officers comment upon the rarity of stricture as a sequela of untreated or partially treated *gonorrhoea*. According to Hospital Returns, 4 Europeans received treatment for gonorrhoea, natives treated included 2,073 cases of *syphilis*, 242 of *gonococcal infections* and 3 of *soft chancres*. There were also 294 natives treated for *yaws*.

*Scientific*.—Dr Haslam repeats last year's recommendation for the early provision of a medical laboratory (see this *Bulletin* 1937 Supp. p. 84\*). As matters stand only routine examinations of urine, blood, and stools were possible during the year. Native microscopists stationed at the large hospitals continued to do useful work and those attached to the Lusaka Native Hospital under the supervision of Dr BOARD who is in charge of the newly established Native Medical Training School (see above) carried out 4,164 laboratory examinations during 1936.

*Financial*.—Expenditure on Medical Department services amounted to £85,091, a sum representing 7.5 per cent. of the total revenue of the Colony during 1936.

P. Grassells Edge

## REVIEWS AND NOTICES

STITT (E R) [M.D. Sc.D. LL.D. etc.] CLOUGH (Paul W.) [M.D. etc.] & CLOUGH (Mildred C.) [M.D.] *Practical Bacteriology, Haematology and Animal Parasitology* Ninth Edition—pp viii + 961 With 208 figs & 4 plates. 1938 London H. K. Lewis & Co. Ltd. 30s. [Review appears also in the *Bulletin of Hygiene*]

This well known book previously published under the direction of the senior author only has again increased in size and one may truly say in usefulness.

The general arrangement follows broadly that employed in the previous edition but in detail the material has been eclectically selected and considerably rearranged.

Part I contains chapters on the general principles of bacteriology and on the systematic study and identification of bacteria. It also has a chapter on the filtrable viruses which is almost entirely new and an entirely new one on the fungi. Other useful sections are those dealing with the bacteriology of water and milk with the principles and problems of immunity and with serological methods.

Part II which has been considerably expanded is devoted to haematology and in no part of the book has the revision been greater than in this section. Special attention has been paid to the technique of blood examinations and methods which are regarded as useful and important are described in detail. In addition to all the routine examinations other less-often practised procedures as for example sternal puncture or the production of Price-Jones curves are described and such matters as the medico-legal application of blood grouping in cases of disputed parentage are discussed. In the present edition a number of new illustrations appear and in this section on haematology two coloured plates and two coloured drawings illustrating normal and pathological blood conditions have been introduced.

Part III of the book is concerned with animal parasitology and concisely summarizes an extraordinary amount of useful data.

Part IV deals with the pathological examinations of the various fluids and organs. It includes various functional tests with explanations of their underlying physiology and there are chapters ranging from such matters as recent views on the function of the endocrine glands to detailed considerations of the principal food deficiencies.

The appendix contains a number of sections dealing with apparatus and stains with media and material and with the chief laboratory procedures useful in diagnosis.

The authors state that they have contrived to bear in mind the needs of those in tropical or remote fields, who do not have access to well-equipped libraries and to all such workers the book can be warmly recommended. It will however have a much wider appeal for it represents a very able attempt to bring together in handy form within obvious limitations a vast amount of laboratory and field data and to correlate with the clinical picture all those ancillary aids which are so necessary for the adequate solution of modern medical problems.

F. Murgatroyd

BULLETIN OF THE HEALTH ORGANISATION (League of Nations)  
1937 Dec. Vol 6 No 6, pp. 895-1153. The Treatment of  
Malaria. Fourth General Report of the Malaria Commission.

This report is concerned with the comparative values of quinine and of synthetic drugs in the prophylaxis and treatment of malaria. Special importance attaches to an authoritative report of this kind.

The Malaria Commission of the League of Nations has formulated certain guiding principles and has fully and clearly described the advantages and disadvantages of each method of treatment. The rôle of the Malaria Commission is primarily to keep Health Administrations informed of such advances in malariology as may be of service to the community and to help them to distinguish what is proved from what is still doubtful. Where the truth is not plainly revealed the Commission endeavours to assess the value of measures or methods by arranging experiments according to a specific programme. This is what happened in the present instance. In 1935 a plan for testing methods of treatment and for experiments in mass drug prophylaxis in the field was elaborated. Countries showing very diverse epidemiological conditions were selected for the experiments. They were Algeria, Italy, the Federated Malay States, Rumania and the Union of Soviet Socialist Republics. Observations were carried out on a total of 12,288 persons. The five national reports, four of which have been published and noted in this *Bulletin*, form the main basis of this Fourth General Report of the Malaria Commission, but consideration has also been given to other relevant scientific contributions that have been published between 1933 and 1936. In the coordinated experiments the synthetic drugs were used in the manner suggested by the inventors of the drugs in question.

The Report consists of three parts.—An introduction in which the genesis of the inquiry and the manner in which it was carried out are described; a critical study of the results of the inquiries and conclusions. Three appendices are attached. The first consists of the U.S.S.R. report (The Health Section of the League proposes to republish this Fourth General Report of the Malaria Commission, with all relevant information in the form of a special volume.) The second appendix is a review of the literature of the therapeutics and collective drug prophylaxis of malaria contributed by E. J. Pampana, the Secretary of the Commission, and the third contains the observations of certain members of the Malaria Commission, concerning the general report which it was not possible to incorporate in the report itself. These observations for the most part do not express dissent from any of the fundamental findings of the Commission which, in all essentials, can be considered as unanimous.

It is not possible in a note of this kind to do more than direct attention to a few of the facts that emerge from these studies.

A daily dose of 0.50 gm. of quinine hydrochloride sometimes causes a temporary disappearance of trophozoites of *P. vivax* and of *P. malariae*, but a daily dose of 1.0 gm. for from five to seven days, is often necessary to cause their disappearance (on an average on the third day) and to remain absent till the first relapse after a varying interval of time. A daily dose of 1.30 gm. in some countries 2.0 gm. is necessary to produce similar results with *P. falciparum*. Quinine in the doses mentioned acts on the young forms of *P. vivax* and of *P. malariae* that are capable of producing gametocytes and also on fully

developed gametocytes. Its action on fully developed gametocytes of *P. falciparum* is very slight but it impedes the formation of pre-gametocytes for this species quinine is therefore directly schizonticidal and indirectly gametocidal. On the acute clinical symptoms of primary benign tertian infections quinine has a definite action from the third day. its action is less reliable and less rapid in malignant tertian infections. The frequency of relapses after quinine treatment is influenced by individual factors and the strain of the parasite. It may be as high as fifty per cent in primary cases of *vivax* and *malariae* infections that have been treated with the usual dose 1 gm daily. Quinine reduces splenomegaly if suitable treatment be given in each attack. this effect is but transitory if exposure to reinfection is frequent. If quinine treatment in the doses mentioned be limited to the strictly necessary number of days it has no adverse effect on the patient's general condition nor does it appear to hinder the process of immunization.

Atebrin in daily doses of 0.30 gm. has a slightly more rapid action on *P. vivax* and *P. malariae* trophozoites than has quinine in 1.0 gm. doses and the absence of clinical symptoms after atebrin treatment lasts somewhat longer. On the trophozoites of some strains of *P. falciparum* atebrin acts more promptly than does quinine. It does not devitalize the gametocytes of *P. falciparum* but its action on the gametocytes of *P. vivax* and *P. malariae* is perhaps slightly more marked than that of quinine. The action of atebrin on clinical symptoms of an acute attack is very marked in some endemic regions this action is more energetic in *falciparum* than in *vivax* infections but not in others. The action of atebrin on relapses is more effective than that of quinine. The spleen rate in communities treated with atebrin decreases somewhat more slowly than in communities treated with quinine but the effect is somewhat more lasting. The yellow discolouration of the skin caused by atebrin is a disadvantage especially during prolonged prophylactic treatment.

Plasmoquine has little if any action on the trophozoites of *P. falciparum* some slight action on those of *P. vivax* and considerably more on those of *P. malariae*. Small doses associated with quinine or atebrin however sometimes appear to reinforce the action of these drugs on the trophozoites of both *P. vivax* and *P. falciparum*. Plasmoquine acts on the gametocytes of all three species but especially on those of *P. falciparum*. Doses of 0.02 gm. devitalize *falciparum* gametocytes and diminish their number. There is no advantage in using plasmoquine alone for the treatment of the clinical symptoms of an acute attack of any form of infection. In association with quinine or atebrin or administered after one or other of these drugs it is effective in preventing relapses of benign tertian and quartan and also apparently of malignant tertian fever. The small doses of plasmoquine now generally used 0.02 gm. have no depressing effect on the general state of the patient. Its prolonged use may exert some influence on the neoformation of haemoglobin.

Published results contain no evidence that quinine combined with atebrin in treatment serves any useful purpose. Quinine combined with plasmoquine is less toxic than atebrin and plasmoquine. For the treatment of adult groups under observation there is no contra-indication to the simultaneous use of quinine and plasmoquine which shortens the duration of treatment. It is indeed one of the most effective means of treating benign tertian and quartan malaria.

The association of atabrin with plasmoquine appears to aggravate the recidity of each. Consecutive treatment with atabrin first (0.30 gm. daily for five to seven days) followed by plasmoquine (0.02 gm. daily for five days) diminishes substantially the number of relapses in malignant tertian and more especially in benign tertian and quartan infections.

In ordinary cases of *P. vivax* infections it is almost immaterial whether quinine or atabrin be used for the treatment of the attack. The aims of mass treatment are to secure the largest number of complete cures (intensive treatment of patients) and to reduce to a minimum the risk of anopheline infection by indirect or direct gametocyte therapy. There are large malarial areas especially in the tropics, where such mass treatment is impracticable. Here it is desirable to provide adequate and easily available treatment for the initial manifestations of the disease. Little or no medical supervision may be possible. In such circumstances the cinchona alkaloids are the most suitable remedy.

Mass drug prophylaxis has a twofold purpose. (1) to protect the population undergoing prophylactic treatment from the clinical manifestations of endemic malaria in order that its working capacity and comparative standard of health may be safeguarded without injury to its premunization even in areas in which it is exposed to repeated reinfection. (2) to reduce in due course the sources from which local mosquitoes may be infected.

No prophylactic method unless applied to disciplined communities under stringent supervision is capable as yet of attaining these two objects. Administered throughout the transmission season daily doses of 0.40 gm. of quinine or bi-weekly doses of 0.30 gm. of atabrin give useful results. The daily dose of 0.05 gm. of atabrin is adequate. Medical supervision is necessary if atabrin be used. The proportion of gametocyte carriers is commonly higher among children than among adults. The doses and form of administration of atabrin and plasmoquine to children is not finally settled. The eradication of malaria from an endemic locality by curative and prophylactic treatment alone is impossible with the drugs at present available though much benefit may be conferred on the population concerned.

The administration of quinine preparations and, all the more of synthetic drugs by the parenteral route should only be resorted to in special circumstances or cases.

NORMAN WILKIN

#### ERRATUM

Vol. 35 No. 2 pp. 163-164 review of Bernard NOCHT's book *Malaria. A Handbook of Treatment, Parasitology and Prevention*. In the last line but one of p. 163 and the first line of p. 164 relating to quinine treatment for grama read grains.

# TROPICAL DISEASES BULLETIN

Vol. 35 ]

1938

[No. 6

## TROPICAL OPHTHALMOLOGY

### A REVIEW OF RECENT ARTICLES    VVIA\*

*Pterygium*—SCHROEDER<sup>1</sup> has suggested that hypermetropia may be a potent factor in the causation of pterygium though he acknowledges that dust and wind may be contributing causes. Hypermetropia leads to increased activity of the ciliary muscle and thus induces a hyperaemia of the anterior segment of the globe. Irritation from wind or dust in the palpebral fissure is naturally greater in a more vascularized and warmer structure. A pinguecula results if the irritation is moderate and a pterygium if it is pronounced. The author has successfully treated pterygia by medical means only but now usually performs a McReynold's transplantation.

*Trachoma*—FOLEY and PARROT<sup>2</sup> have described the micro-organisms which they observed in cases of early trachoma. These are very minute sharply defined round bodies having a diameter of about 0.2  $\mu$  and lie in the cytoplasm of the epithelial cells. A scraping from the outer portion of the superior fornix near the trachomatous area is thinly spread on a slide fixed in iodized alcohol and stained with a mixture of May Grünwald and Giemsa. The authors consider that these organisms are Rickettsia and quite distinct from those described by CUÉNON which they regard as cytoplasmic condensations; the organisms are however allied to the "elementary bodies" of PROWAZEK and HALBERSTAEDER. They suggest the name *Rickettsia trachomatis* Halberstaeder and von Prowazek 1907.

The *Revue Internationale du Trachome* for July 1937<sup>3</sup> contains an account of a discussion on a paper by Jean SÉDAN. M. MARQUEX remarked that the severity of the corneal lesions may sometimes bear but little relation to the development of trachomatous granulations in the palpebral conjunctiva and suggested that pannus and ulceration

\* For the 28th of this series, see Vol. 34 pp. 889-902.

<sup>1</sup> SCHROEDER (Hans). Notes on Etiology and Treatment of the Pterygium.—*Malayan Med J* 1937 Oct. Vol. 12 No. 4 pp. 124-125.

<sup>2</sup> FOLEY (H.) & PARROT (L.). Rickettsia du trachome.—*Arch. Inst. Pasteur d'Algérie* 1937 Sept. Vol. 15 No. 3 pp. 338-351. With 3 plates (1 coloured) [15 refs.]

<sup>3</sup> REVUE INTERNATIONALE DU TRACHOME. 1937 July Vol. 14 No. 3. pp. 162-173.—Sur la contagion du trachome envisagée du point de vue clinique (Rapporteur Jean SÉDAN. Discussion.)



were likely to be most marked when the upper lid of the patient pressed heavily on the cornea owing to a prominent globe or a narrow palpebral aperture. The downward extension of pannus as ptosis increases is suggestive. M. VANCEA voiced an impression that cases of unilateral trachoma might be due to some cause simulating the disease. Regarding the influence of flies as a source of infection Paul J. PETT drew attention to the comparative immunity of Europeans living in fly-stricken trachomatous country. He considered that mild trauma such as that derived from cactus fruit bristles or the application of kohl might aid contagion. In discussing the paper by CUFIXON and NATAF most speakers agreed that the louse was a possible vector. BAILLIART remarked that louse infection must occur in a different manner from typhus in which the organism is present in the blood, possibly contamination from the skin surface took place during the act of biting. Proof that trachoma was endemic where the population was lousy and absent where the reverse obtained would be suggestive. TRAPEZOWITZWA stated that in Russia typhus and trachoma had no endemic relation.

**Keratomalacia**—AYUYAO<sup>4</sup> has found the syndrome night blindness, xerosis of the conjunctiva and keratomalacia to be fairly common in the Philippines. Cases of the disease constitute about one per cent. of hospital admissions to out patient and in-patient clinics and 2.23 per cent. of the blindness in the country is caused by it. Of 301 patients 98 were in the stage of keratomalacia. The keratomalacia met with in the Philippines appears to differ slightly in type from that with which the reviewer was familiar in India, as photophobia and blepharospasm with much pain are stated to have been always present. In India these symptoms were often remarkably slight when compared with the severity of the local lesion. The author regards the respiratory and gastro-intestinal diseases so often associated, as being due to a vitamin A deficiency. Foods containing vitamin C and extracts of vitamin B were found useful adjuvants to codliver oil in the general treatment of the condition. He does not mention the local treatment he employed, but it may be stated that the use of any application which is in the least irritating (e.g. nitrate of silver) may be most injurious.

**Cataract**—STALLARD<sup>5</sup> has given a useful summary of some of the points in the modern technique of extraction. He uses one per cent. pantocain with adrenalin as an anesthetic and adopts the usual blocking of the facial nerve, ruptures the anterior capsular layer with forceps and employs irrigation to free the chamber from lens remnants. The author advocates corneo-scleral suturing to ensure efficient closure of the wound (in tropical practice a "bridge-flap" is probably preferable). He adds the valuable conclusion that "after rendering the operation as safe as possible for the patient by preventing all hazards likely to arise during it there should be the minimum instrumentation of the eye necessary to effect the desired result."

**Glaucoma**—The need for a proper consideration of the general constitutional causes of primary glaucoma has been stressed by FARID

<sup>4</sup> AYUYAO (Conrado D). Clinical Observations on Xerophthalmia.—*Jl. Philippine Islands Med Assoc.* 1937 July Vol. 17 No. 7 pp. 399-402.

<sup>5</sup> STALLARD (H. B). Some Points in the Modern Technique of Cataract Extraction.—*Post Graduate Med. Jl.* 1933 Feb. Vol. 14 No. 148 pp. 49-55. With 3 figs.

**MASSOUD**\* He quotes various observers who have noted a disturbance of sympathetic control in the disease following a derangement of the vegetative system. Faulty metabolism may originate special toxins that affect the uvea and lead to rises in intraocular pressure. The author has observed a relative increase in the number of large mononuclear leucocytes in the blood of glaucomatous patients and this increase appears to be unaffected by any operative relief of the intraocular pressure but to be dependent on a general pathological process.

**Sympathetic Ophthalmitis**—**WALDMAN**,<sup>7</sup> has propounded an interesting theory regarding the origin of sympathetic ophthalmitis. He suggests that the infection is ectogenic and has a nasal origin. He quotes in support the statistics from a number of hospitals which show that the vast majority of cases occur during the winter months when influenzal and catarrhal troubles are prevalent and claims that his theory would explain the well known fact that the disease is uncommon in the tropics. A case of his own showed a rapid and permanent improvement after good drainage of the nasal sinuses and passages had been established. The implication of the optic nerve before the onset of the uveitis suggests too that the infection may spread from a sinus.

**Leprosy**—**PINKERTON**\* reckons that 80 per cent of all leprosy patients and 90 per cent of all nodular leprosy patients develop ocular complications. Tarsorrhaphy is often needed and the author now splits the outer portion of the lower lid and excises triangular portions of the skin and tarsus as in an operation for ectropion. When epiphora is troublesome the accessory lachrymal gland is first partially excised. Electro-coagulation has been found the best treatment for leprosy nodules in the episcleral tissue. An iridectomy if necessary should be wide in order to minimize risk of closure by fresh exudation. Cocaine anaesthesia is often ineffective and novocaine infiltration is preferable.

The prevention of blindness in tropical countries was discussed by **MACCALLAN**\* in a paper read at the 11th International Congress of Ophthalmology at Cairo. With regard to Egypt approximately 80 per cent of blindness in 1933 was due to conjunctival disease. In temperate climates blindness varies per 100 000 of the population from 55 in Holland to 119 in England (in the latter country industrial accidents to the eyes are common) whereas in tropical countries the rate varies from 570 in India to 843 in Palestine. Cyprus and Egypt occupy intermediate places. Ophthalmia neonatorum is rare in Egypt but children soon become affected by other forms of conjunctival disease. Trachoma is of course prevalent. The author suggests that this disease first started in Mongolia and spread westward with Mongol invasions and eastward through Siberia and China to the

\* **FARID MASSOUD** Extra-Ocular Influence in Glaucoma (Constitutional Factors)—*Brit J Ophthalm.* 1937 Oct. Vol. 21 No 10 pp. 559-564 [23 refs.]

\* **WALDMAN** (Bela) The Rhinogenic Origin of Sympathetic Ophthalmia.—*Amer J Ophthalm.* 1937 June. Vol. 20 No 6 pp. 618-625 [23 refs.]

\* **PINKERTON** (Forrest J) Surgery of the Leprosy Eye.—*Amer J Ophthalm.* 1937 July Vol. 20 No 7 pp. 715-720 With 2 figs.

\* **MACCALLAN** (A. F) National Policy to be adopted in a Tropical Country for the Prevention of Blindness.—*Brit J Ophthalm.* 1933. Feb. Vol. 22. No. 2. pp. 65-78.

American Indians by migration. Smallpox is a frequent cause of blindness in insufficiently vaccinated communities. Prevention embraces medical, sanitary and social measures. The ample provision of medical aid with school inspection and an increase in sanitary education constitute the most hopeful measures of prevention.

A review of the ocular troubles connected with tropical diseases has been made by Thornwall DAVIS<sup>10</sup>. He pleads that the subject is important not only to practitioners in the tropics but also to those who work in temperate climates since owing to greater travelling facilities, tropical diseases may now be encountered in temperate climates.

Buxton<sup>11</sup> has given an interesting account of the striking work done by Sir Henry HOLLAND at Shikarpur. The institution is active for eight weeks in the year and an extraordinary amount of work is carried out during that short time from 8 000 to 8 000 patients being dealt with. Glaucoma accounts for about ten per cent of the total eye diseases—this is mostly of the chronic type and acute congestive glaucoma is a rarity. It is stated that corneal ulcers are usually treated with an application of silver nitrate grs. LX to os. I to the whole eye followed by irrigation. Such treatment would seem rather drastic to some surgeons. Holland prefers the intracapsular method of cataract extraction and adopts a modified Smith technique. A peripheral iridectomy is usually performed before lens delivery. A five per cent rate of iris prolapse seems rather high. Possibly a lower rate might be attained if the iridectomy was performed subsequent to delivery.

The *Bulletin of the Ophthalmological Society of Egypt* for the year 1937<sup>12</sup> records the proceedings of the Society in its thirty fourth session. A symposium on glaucoma was the principal feature of the meeting. The incidence, the early diagnosis and the treatment of the disease in Egypt were fully discussed. Dr EISA HAMDY EL MAJINI, BAY reviewed the statistics of primary glaucoma in the Egyptian ophthalmic hospitals during the period 1916 to 1935. The incidence during the four years 1917-1921 varied from 1.77 to 3.25. From 1921 to 1935 there was a steady continuous fall except for a slight temporary rise in 1930. He suggested that the greater facilities for the treatment of eye disease in the country have led to a marked increase in the number of those seeking advice on account of more trivial troubles and that the proportion of glaucoma patients has been reduced in consequence. Dr R. P. WILSON stated that on making an ophthalmic survey of the village of Bahtan in the year 1929 he found the incidence of primary glaucoma to be 0.70 per cent. and secondary glaucoma to be 1.37 per cent. This is higher than in most countries and he remarked that he is convinced that trachoma is to a certain extent responsible. The general causes of the disease were reviewed by Dr FARID MASSOUD and the treatment was discussed by many members. Dr ISRAHIM AHMED MOHAMMED read a useful paper on the pathology of the Meibomian glands in which he indicated their liability to be affected by general seborrhoic conditions and their

<sup>10</sup> DAVIS (William Thornwall). Ophthalmology in the Tropics.—*Puerto Rico Jl. Public Health & Trop. Med.* 1936 June Vol. 11 No. 4 pp. 736-750. [Spanish version pp. 751-767.]

<sup>11</sup> Buxton (Robert). The Eye Hospital at Shikarpur India.—*Brit. Jl. Ophthalm.* 1937 Nov Vol. 21 No. 11 pp. 805-812.

<sup>12</sup> BULLETIN OF THE OPHTHALMOLOGICAL SOCIETY OF EGYPT. 1937 Vol. 30 Session 34 pp. xxx + 272. With numerous illustrations.

role in the causation and maintenance of conjunctival and corneal diseases. Particulars of many interesting cases are recorded in the number.

The Twenty third Annual Report of the Ophthalmic Hospitals Section of the Egyptian Government for the year 1935 testifies to continued progress. New patients numbered 1 034 988 an increase of eleven per cent compared with the previous year. 82 per cent of existing blindness is said to be caused by the acute ophthalmias and the gonococcus is stated to be the predominant infective agent. Ninety nine per cent of the pupils in primary government schools were found to be trachomatous—a truly appalling incidence. The report provides valuable statistics regarding the various eye diseases met with in the country. A chart illustrates most strikingly the intimate relation between the climatic seasonal rise in temperature and the number of patients treated.

The Twenty fourth Annual Report for the year 1936 covers the same ground and includes pictures of the many fine ophthalmic institutions which have been provided during the past thirty two years. The figures given in the previous report are confirmed and it is stated that ninety nine per cent of 10 757 school-children examined were trachomatous about forty two per cent. having the disease in a serious form.

The Eleventh Annual Report of the Memorial Ophthalmic Laboratory at Giza well maintains the high standard of its predecessors. In commenting on the investigations carried out by members of the staff the Director Dr Rowland P Wilson remarks that heat and flies are the most vital factors in the causation of epidemic conjunctivitis in Egypt. direct contagion by hand clothing and washing utensils is a subsidiary factor. Observations on children in villages show that conjunctival infection by pathogenic organisms (Koch's trachoma and gonococcus) occurs during the first three months of life. These are often present before inclusion bodies can be found in every case of the disease. An appendix records some observations by Dr F Maxwell Lyons on Spring Catarrh and the relation of calcium deficiency to the disease. he concludes that such deficiency is not an essential factor in spring catarrh but that it may increase the sensitivity of the patient and influence the course of the disease. The solution to the problem lies in the abnormal hypersensitivity of the patients rather than in elusive activating factors.

H Kirkpatrick

## MALARIA.

MALARIA SURVEY OF INDIA. Kasauli Scope and Syllabus of the Annual Malaria Class for Medical Officers [COVELL (G.) Director].—14 pp 1937 Delhi I M H. Press

This course of malaria instruction lasts six weeks and comprises 40 lectures and 120 hours of practical work in the laboratory and in the field. The number of students is limited to 20 medical officers. The syllabus is comprehensive and complete. The course is held at Karnal in the Punjab. During the course each student carries out a malaria survey of one or more villages. Norman White

VICKERS (W. J.) & STRAHAN (J. H.) A Health Survey of the State of Kedah with Special Reference to Rice Field Malaria, Nutrition and Water Supply 1935-1936.—pp v + 96 With 4 maps, 36 figs on 18 plates & 12 charts. [Part II. Studies in "Rice Field Malaria" in Kedah, pp 10-29 [22 refs.] Part III. A. Malaria in General, pp 30-50]

The Malay State of Kedah is on the west coast of the Malay Peninsula and has a common frontier with Siam. It has a population of 464 000 mostly rural. Alor Star the capital has a population of 25 000 and Sungai Patani the next largest town, 10 000. Alor Star is situated in the middle of rice cultivation which comes into the residential area, right up to the central congested slum. The country is flat there are considerable swamps and the subsoil water is rarely more than two feet below the surface. Though ten miles from the sea swamps and rivers are tidal the water often becoming brackish. Anophelines are abundant. In spite of these conditions there is very little malaria (spleen rate 1.9 parasite rate 2.3). Sporadic cases mostly malarial infections occur. Nearly the whole of North Kedah is similarly almost malaria-free.

Of the numerous anophelines found *A. barbirostris* was the only one found infected. It is probably the chief vector. *A. hyrcanus* Pallas may also be of importance. The breeding places of both these species are very extensive. Neither *A. maculatus* nor *A. umbrosus* are found in the Alor Star area.

Sungai Patani in Central Kedah is in close proximity to foot-hill rice fields which are extensive. There are also numerous seepage areas. The town is subject to invasion by *A. maculatus*, *A. hyrcanus* Pallas and *A. barbirostris* yet no malaria appears to have been contracted there for a considerable period of time.

As a contrast to these conditions rice cultivation in ravines in hilly areas is sometimes associated with hyper-endemic malaria. *A. maculatus* breeding in seepage water is responsible. As the ravines get broader and flatter malaria is less in evidence.

Part II of the report gives information about malaria prevalence in Kedah as a whole. There are areas of high endemicity and even hyperendemicity in the centre and south of the State. Here the disease has a rainfall periodicity mid and end year unlike the autumn periodicity of the rice growing areas. *A. maculatus* is the most important vector. *A. umbrosus* is less common than in other parts of Malaya and *A. sundae* is of little importance as a vector on this part of the coast. In C. Kedah *falciparum* infections predominate.

The rubber estate populations are well looked after but 6% of the total population are out of reach of existing medical org

ROSIER (H J) *Woningverbetering en malaria. (House Improvement and Malaria)*—*Meded. Dienst Volksgezondheid in Nederl* 1937 Vol. 26 No 4 pp 343-363 With 5 sketch m 9 charts English summary

Improvement and reconstruction of houses in native villages now been a consistent antiplague policy for a number of years in J. Special importance is attached to the measure because it is regarded as permanent in contrast to any measures of anti plague inoculation. It is somewhat disturbing to find set out in this article a measured and moderate opinion that such house improvement may not be without danger from the side of malaria. Briefly put it is the old story of engineering works an immigrant population an endemic area borrow pits and rubbish residue.

The malarial outbreaks made their appearance just after the work of house improvement had been finished. Absolute proof of malaria it is admitted, is difficult to establish but figure data are presented in the attempt to make the argument a reasonable one. Many controls lie to hand in the shape of districts in which housing operations have not been carried out. It is significant that 44 out of 71 improved subdistricts showed outbreaks a proportion which could hardly be due to chance. Much of the proof for the malarial character of the outbreaks comes from a study of figures of mortality. It was contended that after the figures for plague had been taken into account and attention paid to dysentery avitaminosis and influenza the remaining figures as a whole represented malarial deaths. Graphs are presented of residual mortality along with plague mortality and exact indication given of the times of house improvement operations on the chart. The main point of the whole argument is that in the Residencies of Batang and Pekalongan, where sub-districts were successively improved the outbreaks of mortality followed during the years 1925 to 1931 the same succession and occurred in each case towards the end of the operations. As a subsidiary but very important part of the argument is the reference to the subdistrict of Petoeng where carried out for departmental reasons. Here also the same increase of mortality a very decided one is shown in the total mortality statistics with and after the building.

It is interesting to learn what are the features of house improvement as a plague policy which constitute a possible cause of malaria. These are—(1) the substitution of a tile roofing for a thatch roofing (2) the temporary removal of roof stiffness of the old house (3) the interior ventilation of the new houses which substituted light and moving air for the darkness and smoky stuffiness of the old house (4) borrow pit digging for material to make tiles and bricks (5) the rate at which work had to progress preventing elaboration of comparatively restful (6) the incursion of workers from outside districts. All these factors probably combine to upset the equilibrium of an economic factor conditions. Some suggestion is also made of an economic factor which with money scarcity due to indebtedness of the people to their government for the improvement of their villages might have led to

some nutritional deterioration and therefore to a lowering of resisting powers. This idea is not, however regarded as being a real factor in the malarial epidemic situation which has presumably arisen. A reference is made towards the end of the article to an English dictum, which is quoted as — "In malaria the engineer is the enemy of the hygienist"

W F Harvey

RAFFAELE (G) & LEGA (G) Osservazioni su di un ceppo etiopico di *Plasmodium falciparum* [An Ethiopian Strain of *P falciparum*] — *Riv di Malariologia* Sez. I 1937 Vol 18 No. 5 pp 388-397 With 14 coloured figs on 1 plate English summary

Some of the malignant tertian cases observed by the authors in Italian East Africa harboured parasites whose morphological characteristics differed considerably from those of the typical *P falciparum*. These differences were sufficiently marked to justify the appellation *P falciparum* var *aethiopicum* of the strain in question. The authors experienced much greater difficulty in infecting Italian strains of *A maculipennis* with this variety of the parasite than with typical strains of *P falciparum*. The crescents of the *aethiopicum* variety are shorter and broader than typical crescents the difference being from 0.5 to 1  $\mu$ . They are less falciform in shape this applies specially to the male gametocytes. Flagellation takes place much more rapidly from 3 to 5 minutes as compared with 15 to 20 minutes for typical strains. The ring forms of the *aethiopicum* variety are larger 3.75  $\mu$  in diameter as compared with 2.68  $\mu$  for typical strains they are less constantly circular in outline and their chromatin granules are somewhat coarser rather like those of young quartan trophozoites. Pigment appears somewhat later than in typical forms. N IV

RUSSELL (A J H) Quinine Supplies in India.—*Records of the Malaria Survey of India* 1937 Dec. Vol 7 No 4 pp 233-244

This is an interesting account of the present position regarding the production of cinchona derivatives in India. India still produces somewhat less than half the total amount (about 200 000 lbs.) of quinine salts consumed each year by her population. That the production could be very largely increased is undoubted, possibly even to the point of making India quite independent of outside supplies. The circumstances that have led to this somewhat anomalous situation are outlined. The amount of quinine consumed each year is certainly not more, and probably much less than a third of the amount that would be required did not ignorance or poverty or both place the drug outside the reach of millions of sufferers from malaria. The provision of adequate treatment for the malarious sick in India is a complex question and the more important of the complexities are clearly discussed by the author. After an introduction describing the vicissitudes accompanying early attempts at cinchona planting in India and Ceylon the following matters are discussed: the quinine question from a world economic point of view; the policy of the Government of India; estimated needs and present consumption of cinchona derivatives in India; cost of production and the possibility of effecting a reduction in price; the possibilities of extension of cinchona cultivation in India; the possibility of effecting mass treatment with cinchona alkaloids in India; and, lastly the means for popularisation of quinine in India. N IV

MIYAHARA (Hatuo) MORISITA (Kaoru) & ISIOKA (Hiozo) *Studies in the Treatment of Malaria XVIII On the Therapeutic Value of Quinine Ethylcarbonate (Euquinine).—Taiwan Igakkai Zasshi (J Med Assoc Formosa) 1938 Feb Vol 37 No 2 (395) [In Japanese pp 186-194 (12 refs.) English summary p 195]* [In

The therapeutic value of quinine ethylcarbonate (euquinine) on chronic malaria (total 15 cases) was summarized as follows: Euquinine is one of the schizont-remedies as it reduces markedly and rapidly schizonts of every species but has no effect on the gametocytes of plasmodium falciparum. Its action against the paroxysm and persistence of the parasites is almost equal to that of other quinine salts. But its permanent-cure-rate determined by the 8-weeks-after observation method is lower especially on benign tertian malaria than those of other quinine salts. The nature of its by-effects is the same as those of other quinine salts however the intestinal disturbance is very mild or absent altogether. From the above results we reached the conclusion that the therapeutic value of euquinine in the mass-treatment was low because euquinine was most widely used by children who were the source of the infection of malaria in the field and its cost was high. The drug used in the mass-treatment must be more powerful in permanent-cure-effect and cheaper in cost than euquinine.

MIYAHARA (Hatuo) *Studies in the Treatment of Malaria. XVI. On the Therapeutic Value of the Cinchona Total-Alkaloids (Takaquina) in Malaria.—Taiwan Igakkai Zasshi (J Med Assoc Formosa) 1937 Dec Vol 36 No 12 (393) [In Japanese pp 2609-2618 (10 refs.) English summary p 2619]*

Takaquina is a totaquina containing 40 per cent quinine. Nine cases of benign tertian 4 of quartan 3 of malignant tertian and 4 cases of mixed infection benign and malignant tertian were treated with takequina. The treatment lasted 14 days 0.8 gm. a day. The relapse rates were benign tertian 48 per cent malignant tertian 20 per cent and quartan nil. The author considers this cheap remedy to be eminently suitable for mass treatment.

BELLON (J G F L.) & KERNY (M M) *Les antimalariques synthétiques dans le traitement du paludisme [Synthetic Anti-Malaria Remedies].—Rev Service Santé Milit 1937 Oct Vol 107 No 4 pp 491-512. (36 refs.)*

A good description of the synthetic drugs in their use in the treatment of malaria. The chemical properties therapeutic action dosage methods of administration and indications and contra indications for the use of each are adequately described. The paper contains nothing new or original.

METILLA (Valentin) FÁBREGA (José María) & VICH (Antonio) *Ueber unsere heutigen Erkenntnisse in der Malariabehandlung [Our Present Knowledge of the Treatment of Malaria].—Arch f Schiffs Trop Hyg 1938 Mar Vol 42 No 3 pp 95-107*

The authors describe their own scheme of treatment with atebirin and plasmoquine which is on the usual lines thus they give them in the



of the community. The weekly distribution of drugs has sufficed in all cases in Morocco. bi-monthly distribution has proved insufficient when anophelines have been extremely prevalent. \ II

MEZINCESCU (D) & CORNELSON (D A) with the collaboration of C. LAZAR & L. BUŞILA. Sur l'efficacité de l'atébriane et de la quinine dans le traitement prophylactique du paludisme. (Deuxième mémoire) [The Value of Atebrin and of Quinine in the Prophylactic Treatment of Malaria. Second Report.]—*Arch. Roumaines Path. Expér. et Microbiol.* Paris. 1937. June Vol 10 No. 2. pp 171-183

The first report on this experiment was noted in this *Bulletin* 1937 Vol 34 p. 159. During 1935 from the 1st of June to the 1st of November the administration of atebrin and quinine was continued as before except for a control group which this year was left without any treatment at all. Of the 271 persons in the village 101 received atebrin 99 quinine and there were 71 controls. As before adults received 0.050 gm. of atebrin or 0.40 gm. of quinine each day. children received smaller doses according to age. The blood of all was examined twice a month during the period of drug administration and once a month for the rest of the year. Between June and October when the drugs were being given the parasite index in the atebrin group was 1.9 per cent. in the quinine group 1.8 per cent. and in the control group 15.1 per cent. There were practically no cases of clinical malaria in the treated groups.

In 1936 there was no prophylactic use of drugs but the village was kept under as careful observation as before. During this year there were 33 cases of malaria among what had been the atebrin group 26 cases among the quinine group and 13 among the control group. The average parasite rate for all three groups was 7.8 per cent. These figures illustrate the usual endemic conditions one finds in untreated villages in the neighbourhood. \ II

PARROT (L.) CATANZI (A.) & AMBIALET (R.) with the co-operation of J. CLASTRIER. Comparative Experiments in Mass Prophylaxis of Malaria by Means of Quinine and of Synthetic Drugs (Quinacrine and Præquine).—*Bull. Health Organisation (League of Nations)* 1937 Oct. Vol 6, No 5. pp 683-785. With 23 figs.

This is an account of experiments carried out in accordance with a programme elaborated by the Malaria Commission of the League of Nations. The tests were to comprise the daily administration of small doses of quinine or of quinacrine to the entire population of two malarial areas, throughout the transmission season. the systematic treatment of all cases of malaria detected in another malaria district during the same season by means of either quinine or quinacrine alone or combined with præquine. and the medical and microbiological observation of these groups and of a control group until the following transmission season. No other protective measures were to be adopted.

The district in Algeria selected for these experiments was R'oufi. It is some 200 kilometres from the Mediterranean and very near the Sahara. The population of Berber origin number 2,200. They live in a deep canyon that has been excavated by a torrent, the Oued el

Abiodh and grow crops on the alluvial deposits of the river. Each tribe of which there are eight occupies two villages, one situated at the bottom of the canyon and the other perched on the plateau; the latter is used as a winter and spring resort. At the beginning of July they migrate to near by high mountains where they stay about a month. The population is a poor one. In November 1934 after the epidemic season the mean splenic index was 39.3 among children under 15, the mean parasite index was 17.5. Of the parasite carriers 64 per cent harboured *falciparum*, 23.5 per cent *vivax* and 12.5 per cent *quartana*. Three Anopheles are found: *maculipennis hispaniola* and *marleri*. *A. maculipennis* is found only at the mouth of the canyon where the Oued el Abiodh forms a marsh. *A. marleri* is a wild species that plays no part in malaria transmission. *A. hispaniola* is found all along the river; during low water from June to November the river constitutes an immense breeding place. When a spate occurs all larvae are swept away. This occurred several times during the summer of 1935 when this experiment was being carried out. Mosquitoes practically disappeared and there was no summer and autumn epidemic at all. It was therefore impossible to test the value of drugs as a prophylactic but there was a rarely found opportunity of watching the natural evolution of residual infection and of determining the influence of drugs on individual parasitism without the complication of reinfections.

The villages were divided into a quinine prophylaxis area, a quinacrine prophylaxis area, a treatment area and a control area. The experiments are reported in very great detail; an adequate summary in short space is impossible.

The daily administration of quinine (either aristoquine or neutral hydrochloride) 0.10 to 0.40 gm. according to age to 294 individuals considerably reduced splenic and splenometric rates and brought the parasite and gametocyte rates rapidly down to zero and kept them there almost constantly throughout the usual period of transmission. Comparison with neighbouring localities indicated that these improvements were due mainly to the drug's action. The reduction of the epidemic potential of the virus reservoir to zero or thereabouts justifies the conclusion that even had weather conditions favoured mosquito breeding, transmission of malaria would have been rare in a community thus protected. The aristoquine chocolate drops were very readily taken by children.

Quinacrine from 25 milligrammes every second day to 5 centigrammes a day according to age was given to 426 individuals. The endemic indices were reduced more than in the control villages but the parasite and gametocyte rates were often above zero during the transmission season. Difficulty was experienced in getting small children to take the drug in spoonfuls of syrup. The quinacrine doses given appeared to be too small, only one-sixth of the daily curative dose.

In the absence of an epidemic there was obviously no opportunity of studying the influence of the systematic treatment of cases on the trend of the epidemic. In the treatment sector only 19 cases were treated. *P. malariae* appeared to resist quinacrine longer than did the other two species.

In both the quinine and the quinacrine areas the curve of the gametocyte rate followed the curve of the parasite rate. This would be difficult to explain if these drugs have no gametocidal action.

fresh infections as late as October 7th and infection then acquired takes not more than 3 weeks to reach the salivary glands. *Anopheles* spread malaria parasites from man to man and from house to house in the autumn and man keeps the parasites alive till the next transmitting season. *Anophelina malaria* dies out in a house by a deterioration of the human parasite reservoir or by lack of *Anopheles* resulting from removal of appropriate hiding places. Sometimes human parasite carriers lose their infectivity before they are free from parasites. The failure of infected *Anopheles* in a house to cause malaria among its inmates during the next year may be due to partial immunity or to unusually prolonged incubation periods. N IV

CORRADETTI (Augusto) Ricerche sperimentali sulle preferenze alimentari delle varietà di *Anopheles maculipennis* [Food Preferences of *Anopheles maculipennis*.]—*Riv di Malarologia*, Sez. I 1937 Vol. 16. No 6. pp 419-433 With 1 chart. English summary

The methods employed by preceding AA to determine alimentary preferences of species of *Anopheles* and also the defects and inadequacy of these procedures are discussed

"The method consists in allowing a group of mosquitoes, belonging to a certain species and all born the same day to feed once a day on a certain animal eliminating each day those mosquitoes that have bitten, until the whole is exhausted. The animal becomes more acceptable to the anopheline species the higher the percentage of mosquitoes that bite and the lower the number of days necessary to exhaust the batch. Experiments have been carried out by this method on 552 *labranchiae* 491 *clulus* 774 *atroparvus* 548 *typicus* and 240 *melanoon* to determine the alimentary preferences of each variety in respect to the blood of the following animal species—man, ox, pig, donkey, rabbit and fowl.

The following are the conclusions—

(a) *typicus* and *melanoon* varieties show a general tendency to bite less than the other varieties under the same experiment conditions

(b) *typicus* and *melanoon* varieties show a preference for ox blood while the other varieties show no special preference

"(c) the adaptation index to human blood is extremely high in the *labranchiae* and *clulus* varieties slightly less in *atroparvus* and very low in *typicus* and *melanoon*"

SWEET (W. C.) & RAO (B. A.) Races of *A. stephensi* Liston, 1901.—*Indian Med Gaz* 1937 Nov Vol 72 No. 11 pp 665-674 With 2 graphs [17 refs]

Two races of *Anopheles stephensi* distinguished by egg measurements appear to exist in India

The differentiation of the varieties of *A. maculipennis* in Europe has stimulated enquiries along the same lines in other parts of the world and on other species. In this preliminary report measurements of eggs of *A. stephensi* from many parts of India are given on the basis of which they are found to fall into two groups (1) The B type (first recognized in Bangalore) with an average of 555 microns in length 204 in breadth 294 in length of float and 18 ridges on the float. (2) The "M" type (first obtained in Marikanave) with an average of 476 microns in length 160 in breadth, 218 in length of float and 13

ridges on the float. The B type seems hardier feeds and breeds more readily in captivity and appears to prefer human blood. There is some indication that this is the urban malaria-carrying form. The M type is difficult to breed in captivity seems to prefer animal blood and is perhaps the rural form and a poor carrier of malaria. But these points cannot be regarded as definitely established yet. When crossed the two races proved relatively infertile sometimes the first crosses were sterile or laid sterile eggs sometimes sterile eggs appeared in the next generation. The authors regard the B form as *A. stephensi* type form and propose to call the M form *A. stephensi* var *mysorensis*.  
V B Wigglesworth

SMALT (F H) Periodieke drooglegging van Sawah's ter bestrijding van malaria [Periodic Drainage of Sawahs in the Struggle against Malaria.]—*Meded. Dienst d. Volksgezondheid in Nederl. Indië* 1937 Vol. 26 No 4 pp 285-299 With 4 figs on 1 plate & 1 plan.

Every year the endemic malaria of certain districts in Bali Netherlands India shows aggravation with the coming of the wet east monsoon and may be regarded therefore as definitely seasonal. The author is concerned here with one aspect of the campaign against malaria that directed towards dealing with mosquito breeding in the sawahs where the rice crop is grown. The crop is partly under water and larvae of *Anopheles aconitus* may be found in abundance in these water areas. A test examination moreover gave for the female *Anopheles* an infective index of 7 per cent which explains the very large number of new cases of malaria in the district at the time. It is known that *A. aconitus* breeds in running water and gives rise to a fatal type of malaria.

An important fact in connexion with the antilarval measures adopted was that the cultivators of the rice crop are in the habit of periodically draining off their fields sometimes on three successive days. By thus withholding water the further increase of new carbohydrates is limited and the transformation of carbohydrates already present is directed to the production of starch. It was considered probable that the breeding of the mosquito could be interfered with at one phase of its cycle by means of this field-drying procedure and trial was made of it. Drainage of the fields was applied over a space of almost 2 months 7 times for two successive days and suitable measures were taken on each occasion for determining what number of larvae were present on reflooding. The necessary controls were set up. It was found that the lethal effect of drying differed somewhat in its incidence upon nymphs, larvae and eggs respectively. The nymph was the most susceptible and the egg the least. As the development time from egg to nymph may be reckoned at about 10 days the period for which the fields remained flooded was chosen as 9 days. The result obtained was that *Anopheles* larvae were reduced to 33 per cent of their previous number by the first drying of fields and that they could be held at a figure of 27 to 33 per cent throughout the whole period. The figures for *Culex* were slightly different. It was very important however to determine whether any economic loss could be detected in the application of this method of sanitation to rice fields. Calculation showed that the periodically drained fields had furnished 92.6 per cent. of agricultural produce compared with the normally

flooded fields. This diminution in crop may be regarded as negligible in comparison with the prophylactic importance of the measure. The measure was accordingly officially adopted in South Bali for the prevention of seasonal malaria. Other tests of the effect of drying upon the breeding cycle were carried out in the laboratory by means of artificial swamps and petri dishes. The general conclusion to which the author comes is that his method of purification by drying wet rice fields can be expected to kill off 75 per cent of larvae of the *anopheles* group. Unfortunately its efficiency is limited to some extent by the presence of small rain pools which can act as breeding places.

CIUCA (M) TONESCU (P) & BADENSKI (G) with the collaboration of A. BADKASHI P. TONESCU & M. TERITEAXU Contribution à l'étude de la virulence du *Pl. knowlesi* chez l'homme. Caractères de la maladie et biologie du parasite [Virulence of *Pl. knowlesi* in Man. Characters of the Disease and Biology of the Parasite.]—*Arch. Roumaines Path. Expér. et Microbiol. Paris* 1937

Mar Vol 10 No 1 pp. 5-28 With 11 coloured figs. on 5 plates & 2 text figs.

BALLIF (L) CHELARESCO (M) LAURENCO (M) & ZOTTA (E.) Contributions à l'étude de l'action pathogène de *Pl. knowlesi* pour l'homme (considérations sur l'immunité naturelle et l'immunité acquise contre cette espèce de parasite) [Pathogenicity of *Pl. knowlesi* for Man—Natural and Acquired Immunity]—*Bull. Soc. Path. Exot.* 1937 Apr 14 Vol 30 No 4 pp. 305-315 With 1 chart

These two important papers have to do with the behaviour of *Plasmodium knowlesi* one of the malarial parasites of monkeys in the treatment of general paralytics. In the first paper are described a series of cases of town origin and which on that account had little if any previous malarial infection while the second paper deals with cases which were from a malarial region in which a general malarial index of 90 per cent was obtained.

The first paper states that 158 general paralytics were inoculated with *P. knowlesi* and 79.8 per cent of these became definitely infected and revealed both fever and parasites 18.8 per cent had an abortive infection while 4.4 per cent showed only a few parasites in the blood and had no fever. In a group of 38 general paralytics who had recovered from a previous human malarial infection inoculation of *P. knowlesi* resulted in definite infection in 34 per cent abortive infection in 42 per cent and no infection in 10 per cent. Of 29 patients who had recovered from a *P. knowlesi* infection reinoculation was not followed by a durable infection in any one instance though in a few cases parasites were present in the blood for a limited number of days. In general the illness produced by *P. knowlesi* infections in man is of a mild type even in those cases in which the blood shows a very large number of parasites. The attacks of fever varied from one to twelve and the duration of each attack was five to eight hours. The clinical features are illustrated by a number of temperature charts and descriptions of selected cases. As regards the morphology of the parasite in man depicted in a number of well executed coloured plates there seems to be little variation from that of the parasite in the blood of *Macacus plianthus*. Successive passages in man do not bring about any alteration in virulence either for man or the monkey.

In the second paper are given the results of the inoculation of *P. knowlesi* in a series of cases of rural origin where a previous human malarial infection may safely be assumed to have taken place. Of 163 cases inoculated only 46 per cent became infected. This figure is compared with a series of this type of case in which 29 patients who had previously been treated with a human malarial infection were after recovery inoculated with the monkey parasite. Only 17 per cent. became infected. In the rural cases the disease produced was milder than in the others a single dose of fifty centigrams of quinine occurred while in the others a previous *P. knowlesi* infection gave an absolute resistance to further infection with this parasite. If the patients had been treated previously with *P. vivax* they showed a complete resistance to the same strain of this parasite and a partial resistance to other strains and also to *P. knowlesi*. The authors conclude that there is probably an antigenic factor common to the malarial parasites of man and the monkey as well as an antigenic factor specific to each parasite and even to strains of the same parasite.

SCHILLING (Claus) Immunität bei Malaria und ihre praktische Bedeutung [Malarial Immunity and its Practical Significance.]—*Arch f Schiffs- u Trop Hyg* 1937 June Vol. 41 No 6 pp 443-448 C M Henry

The author puts the question Is it possible by treatment of malaria short of sterilizing to allay the symptoms and to damp down the infection and thereby lead to a labile infection and immunity against superinfection? After discussing this question he concludes by posing the following problems —1 What is the course of malaria in children in endemic malarial areas —2 What is the course of malaria in children if the symptoms and also the relapses are only so far treated with quinine or atabrin that the children develop well increase in weight anaemia and cachexia are checked but the parasites are not completely killed off that is to say a labile infection remains? 2. In children so treated does there exist an immunity against superinfection? For the solution of this question continuous observations in hyperendemic areas on children should be made to note if relapses are less frequent and severe. Experimental reinfection might be considered. 3 Is there a sterile immunity in malaria? For the solution of this problem the best method is to transfuse large quantities of blood to persons who have never had malarial infection in this connexion the use of the air mail will help materially by carrying blood rapidly from the immunes in a malarial area to the definitely non immunes in a malaria free district. E D H Greig

BURKE (M. R.) Antimalaria Report upon the Proposed Cantonment Site at Kau Lung Tai.—*Jl Roy Army Med Corps* 1937 July & Aug Vol 69 Nos 1 & 2 pp 1-15 84-100 With 1 folding map

PEREIRA (O de Louola) A epidemia do paludismo na leprosanaria (rápida-mente jogulada pelo musonato de atebriana) [Outbreak of Malaria in a Leprosy Asylum rapidly suppressed by Atebrina Musonate]—*Bolet Germl Med e Farm* 1937 May June & July Ser 18 Nos 5 & 6 & 7 pp 159-170

## VENOMS AND ANTIVENENES.

GHOSH (B N) & DE (S S) Investigation on the Isolation of the Neurotoxin and Haemolysin of Cobra (*Naja naja*) Venom.—*Indian Jl Med. Res.* 1938 Jan Vol 25 No 3 pp 779-786.

The authors have shown previously that by cataphoresis under suitable conditions fully two-thirds of the proteins associated with the neurotoxin and haemolysin of dried cobra venom (*Naja naja*) can be removed and that the neurotoxin can be in part at least separated from the haemolysin. Further purification however was not obtained in this way and they have made trial of fractional precipitation of proteins by electrolytes adsorption by colloidal precipitates and subsequent elution.

By fractional precipitation with sodium sulphate followed by adsorption on and elution from tungstic acid surface dialysis and cataphoresis, they were able to obtain an active sample of neurotoxin free from haemolysin 17 times more toxic than the dried crude venom. The haemolysin constituent has been separated by precipitation with NaCl and further purified by heating to 88°C which coagulates other proteins from a faintly alkaline solution purification being further completed by cataphoresis. The final product is four times as active as the crude venom. H H S

SIEMENS (Hans-Henning) Untersuchungen ueber die Toxine von Bastarden europäischer Giftschlangen. [On the Venom of Hybrid European Snakes.]—*Med Klin* 1938 Feb 11 Vol 34 No 6. pp 186-187

The ER antivenene of the Pasteur Institute prepared with the venoms of *Vipera aspis* and *V. berus* is a fairly potent antidote to most European snake poisons but is powerless against that of *V. mesocorona*. The reverse of this obtains as regards the antivenene prepared at the Vienna Institute by injection of horses with South American species of *Bothrops* venom. The serum prepared at the Behring Werken Marburg, with the venom of *V. ammodytes* is active also against *V. berus* *V. aspis* *V. latas* and *mesocorona*.

Opportunity was taken to carry out experiments on the venom of a hybrid of a male *V. berus* and a female *V. mesocorona* vipera whose venoms were serologically different. The details of the experiments are given in a protocol in the paper the conclusion was that the venom of the hybrid showed, as regards its neutralization by various antivenenes the properties of a *V. berus* toxin. H H S

LINK (Th) Der Einfluss der Schlangengifte auf die Blutgerinnung 3 Mitteilung Australische Giftschlangen. [Australian Snake Venoms and their Effect on the Clotting of Blood.]—*Ztschr f Immunittisf u Experim Therap* 1938. Feb 18 Vol. 92 No 2/3 pp. 133-140 [13 refs]

Four species of snake venoms were the subject of this study the Death Adder (*Acanthopsis antleriensis*) the Copperhead (*Demonax superba*) the Tiger Snake (*Notechis scutatus*) and the Black Snake (*Pseudonotia porphyriacus*).

In one per cent. solution the first had no action on blood coagulation the second a weak and the last two a strong action. These last three venoms after being heated to 70 C for 15 minutes suffered considerable diminution in clotting power which however was not thereby destroyed, nor was the toxicity for rabbits and guinea-pigs reduced by the heating.

When ovalate plasma is clotted by the *Notechus* venom much of the toxin is combined in the clot and the serum contains but a fraction, about one-fifth of the original poison. Previous treatment of guinea-pigs with heparin and germanin which prevent the clotting does not affect the amount of the m.l.d. of venom subsequently injected. On the other hand the susceptibility of guinea-pigs to the *Notechus* venom after previous treatment with colloidal copper (which according to v. JANCsó puts the reticulo-endothelial system out of action for the time) is much reduced so that some ten times the ordinarily fatal dose is tolerated.

H H S

VON KLOBUSITZKY (D) & KÖNIG (P) Weitere immunologische Studien ueber die gerinnungs-fördernde Substanz des Giftes der *Bothrops jararaca* [On the Coagulant Principle of *Bothrops jararaca* Venom.]—*Ztschr f Immunitätsf u Experim Therap* 1938 Mar 22 Vol 92 No 4/5 pp 418-430

VELLARD (Jehan) Variations géographiques du venin du serpent à sonnettes sud-américain *Crotalus terrificus* Laur [Geographical Variations in Rattlesnake Venoms.]—*C R Acad Sci* 1937 May 31 Vol. 204 No 22 pp 1679-1681

By a technique similar to that which he employed to determine variations in *Bothrops atrox* venom (see this *Bulletin* 1937 Vol. 34 p 656) the author has undertaken an investigation of *Crotalus terrificus* venom from specimens in different localities *s.e.*, South and Central America, northern Argentine and southern Mexico. In the district north of the Panama Canal this is a transition form, *C. terrificus durissus*. *Crotalus* venom is usually yellow but that from specimens from central and southern Brazil is white and on the borders it may be either. Those studied were snakes from Venezuela, northern Brazil (Bahia and Pernambuco yellow venoms) southern Brazil (São Paulo white venom) the Argentine and Paraguay. In a table the properties of the Costa Rican *Crotalus* are given for comparison.

The coagulant and haemolytic properties vary but little both are well marked in all those studied. The coagulant is perhaps a little less in the yellow venoms of northern Brazil, the haemolytic a little weaker in the white venoms of the south. The Costa Rican has no haemolytic action.

The proteolytic action is marked in the Venezuela venom and more so in the Costa Rican, but almost entirely lacking in the others. The toxicity varies inversely as the proteolytic action, being greatest with the southern, which are the most poisonous of American crotalines, high also in Venezuelan, much less in the Costa Rican. The venom of the most southerly specimens shows the limit of a gradual modification of that of the northern regions in coagulant, phospholytic, proteolytic and neurotropic. The "centre of dispersion" of the genus is the dry regions of northern Mexico and southern United States.



away from this the venom of *C. terrificus* undergoes progressive modification. The neurotropism increases and proteolytic action lessens till in the Argentine and southern Brazil it is highly neurotropic.

H H S

MACHT (David I.) Comparative Toxicity of Sixteen Specimens of *Crotalus* Venom.—*Proc Soc Experim. Biol & Med* 1937 May Vol. 36. No 4 pp 499-501

VELLARD has estimated the variations in *Crotalus* venom obtained from different localities (see above) the present author has tested sixteen specimens from the same place San Diego California—one sample of mixed venoms two from *C. cinereus* and the remainder from 13 different varieties.

In each case the venom was centrifuged and dried at a relatively low temperature to obviate deterioration by heat. The author studied the effect of keeping the venoms, testing them on mice and on seedlings of *Lupinus albus*. The m.l.d. for mice of 22 gm was very variable ranging between 0.045 and 0.3 mgm. The toxicity bore no relation to the age of the venom and the reason for difference in toxicity is not known—it may result from several factors—age of snake health nutrition among others. The potency of specimens of venom kept at 12–17°C in the dark remained unchanged saline solutions were found to deteriorate rapidly. The toxicity for plants in general was parallel with that for animals.

H H S

TAUBE (Harold N.) & ESSEX (Hiram E.) Pathologic Changes in the Tissues of the Dog following Injections of Rattlesnake Venom.—*Arch. Pathology* 1937 July Vol. 24 No 1 pp 43-51 With 2 figs. [13 refs.]

The authors have recorded the changes, macroscopic and microscopic, in the bodies of dogs killed by intravenous injection of *Crotalus* venom. The macroscopic findings at autopsy were marked rigor mortis, numerous petechial haemorrhages in the palpebral conjunctiva and the tongue haemorrhages, petechial and diffuse, in all the thoracic viscera, in the epi- and endo-cardium, and diaphragm superficial haemorrhages on abdominal viscera, large in stomach and small and large intestines diffuse and punctate haemorrhages in the brain—in short, the keynote was haemorrhage. S W MITCHELL, of New York concluded that this resulted from direct effect of the venom on the vascular walls and FLETCHER and NOGUCHI concluded that a substance which they called "haemorrhagin," in *Crotalus* venom caused haemorrhage by its lytic action on the vascular endothelium, by rents in the walls of capillaries and venules, not by diapedesis. The authors confirm this—they found evidence of damage to the vascular walls in all the tissues studied. At the same time the blood vessels of the tissues were engorged, and the parenchyma showed granular degeneration. The longer the duration of action of the venom, the greater the disintegration of the vessel walls. "Crotalin is an active poison which contains a principle that may be regarded as a cytolytic for endothelial cells of blood vessels and for other protoplasmic structures. Its effect on the walls of minute vessels results in the physiologic manifestations and changes in tissue which are characteristic of certain types of shock" [see also FELDBERG & KELLAWAY below]

H H S

MARX (Walter) & PECK (Samuel M) Cataphoretic Separation of Toxic Components of Moccasin Venom.—*Proc Soc Experim Biol & Med* 1938 Feb Vol 38 No 1 pp 84-86

Owing to the fact that the active components of snake venoms are closely related to if not actually proteoms attempts to separate them have not usually been very successful. By means of Todd's cataphoresis chamber an electrical potential of 120 volts DC was applied to solutions of moccasin venom for three to five hours at different pH values. The authors were thus able to demonstrate that the venom contains two different haemolytic components. At pH 6 and 7 haemolysin A migrated to the anode and B to the cathode and the latter could be separated from haemorrhagin since the latter migrated only to the anode. They conclude —

Our findings seem to indicate that the molecules responsible for the action of hemolysin B are different from those which give rise to the other toxic effects of moccasin venom so far studied. Hemolysin B has a much more basic character

HYU (Henten) Ueber die Wirkungen der Gifte der Crotalinae Formosa. [The Action of the Crotaline Venoms of Formosa].—*Japanese J Med Sci* IV Pharmacol. 1937 Vol. 10 No 2/3 pp 99-127 With 10 figs [29 refs.] H H S

VELLARD (J) Une *Lachesis* peu connue du nord-est du Brésil *L. erythromelas* Etude de son venin [*Lachesis erythromelas* a little-known species in North-East Brazil].—*C R Soc Biol* 1938 Vol. 127 No 1 p 38

*L. erythromelas* a small snake the largest specimen of which seen by the author was 825 mm. (33 inches) in length has been till now confused with *L. langbergi* which is not found in Brazil. The venom is white with a potent coagulant action *in vitro* and *in vivo* intravenously injected into pigeons it is ten times as potent as that of *L. jararaca*. It has a marked neurotropic action causing progressive motor paralysis and disturbance of respiration and circulation. It is in this action that its danger lies for an average specimen yields by pressure of the glands only 20-30 mgm. of dried venom.

H H S

TOMOYAMA (Kazuo) An Experimental Study of the Effect of Infra-Red Rays upon Snake Venom.—*Tsishan Igakka Zasshi (J Med Assoc Formosa)* 1937 Sept. Vol 36 No 9 (390) [In Japanese pp 2117-2135 With 1 chart. English summary pp 2135-2137]

Two viperidae poisons those of *Trimeresurus mucrosquamatus* (A) and of *Naja naja atra* (B) of the five poisonous snakes of Formosa were studied in particular the haemorrhagic haemolytic and haemagglutinin properties.

First as regards the physical effects of the rays in the case of A a whitish appearance was seen after 20 minutes exposure and after 30 minutes floccules which in another ten minutes settled to the bottom leaving a clear supernatant fluid. With B there was turbidity after 30 minutes and after 60 minutes this was more marked and a few particles separated out but there was no flocculation even after 7 hours exposure.

Both showed decreased toxicity a 1 in 1 000 dilution of *A* decreased to half its toxicity in 20 minutes a 1 in 100 lost four fifths of its toxicity in 30 minutes and nineteen-twentieths in 60 minutes and no longer produced haemorrhagic changes in guinea-pigs and mice. *B* was more resistant and the 1 in 1,000 dilution showed no changes after 40 minutes exposure slight loss in 1½ hours and halved in 3 hours.

*A* showed little alteration of haemagglutinic properties (1 in 1,000 dilution) in 20 minutes but thereafter the loss was rapid and became nil after 2 hours exposure. As regards haemolysis *A* showed less resistance to the rays than did *B*. The former ran parallel with the haemagglutinic property practically no change after 20 minutes, but almost totally destroyed after 2 hours only a faintly discernible haemolysis being elicited with the 1 in 1 000 dilution. With *B* there was no change after 40 minutes and very slight reduction of haemolytic power after an hour and was still appreciable even after 7 hours exposure.

H H S

FELDMERG (W.) & KELLAWAY (C. H.) The Circulatory and Pulmonary Effects of the Venom of the Australian Copperhead (*Demonixia superba*)—*Australian Jl Experim Biol & Med Sci* 1937 June Vol 15 Pt 2 pp 81-95 With 6 figs [10 refs.]

The authors have previously demonstrated the liberation of histamine from the perfused lung by the venom of the Australian copperhead snake (*Demonixia superba*) and they followed this up in the present article by investigating which of the symptoms of this form of snake-poisoning are so attributable by comparing the effects of histamine with those of the venom.

The experiments were made on cats anaesthetized with dial liquid (Ciba) 0.5 cc per kg being injected intraperitoneally. Both vagi were cut a tracheal cannula was inserted and the blood-pressure was recorded from the left carotid artery. The pressure in the pulmonary artery was recorded by the method described by Kellaway and LeMessurier (*Australian Jl Experim Biol & Med Sci* 1936 Vol. 14 p 57). In some experiments the histamine content of the lungs was determined. The haemoglobin percentage of the blood was estimated by the Sahli method. Samples of blood were taken with a syringe from the tied femoral artery which was kept closed with a bulldog clamp in the intervals between the successive samples. The blood in an amount of 0.5 cc was mixed with 7 cc. N/10 HCl and kept for half an hour before testing. For the estimations we used 0.3 cc. of this mixture which corresponded to 20 cmm of blood the volume usually taken for haemoglobin estimation.

For the minute changes as shown by pulse tracings and photomicrographs the original should be consulted. The article is replete with interesting observations and the main features only are referred to here. As regards the circulatory effects those of histamine and of copperhead venom are very similar—the initial fall of blood pressure due largely to peripheral vasodilatation, an interruption from output of adrenaline and a secondary lethal fall. As DALE and his co-workers have shown in histamine shock the capillaries become more permeable and allow escape of fluid similar loss of fluid was noted after injection of the venom with pulmonary oedema. The changes in the lungs resulting from injection of the venom ran parallel with the histamine content and there is an increase in the corpuscle concentration of the

blood to as much as 60 per cent. owing to fluid escape after injection of venom and susceptibility of the lungs to cell injury and of the lung vessels to histamine and to venom and a high histamine content of the lungs are generally associated. In other words the effects of the venom on the lungs and circulation are due to the combination of cell injury and liberation of histamine. In kittens the histamine content of the lungs is low and the action of the venom on the pulmonary vessels is slight this increases with the age of the animal.

H H S

TARABINI-CASTELLANI (G) & CARTOLARI (C) Contributo allo studio dell'azione del veleno di vipera aspis sul sistema nervoso [The Action of the Venom of *Vipera aspis* on the Nervous System. —Arch Ital Sci Med Color e Parassiti 1937 Aug Vol 18. No 8 pp 451-460 With 5 figs. (10 refs.)

The authors tested on frogs the effects of *Vipera aspis* venom (a) in large doses acting for a long time injecting into the dorsal sac 0.15 cc of a 10 per cent dilution of the fresh venom and noting the effect for 1½ hours (b) larger doses acting for a short time—0.3 cc of a 10 per cent solution for 5 to 15 minutes (c) average doses 0.05 cc of the same solution watched for 1½ hours. The aim was to determine the first point of attack in the neuromuscular system. They concluded that the central nervous system was primarily affected next the muscles and last the nerves.

H H S

CESARI (E) & BOQUET (Paul) Détoxication du venin de *Vipera aspis* par le ricinoléate de soude vaccination du lapin par le venin détoxiqué [Detoxication of the Venom of *V. aspis* by Sodium Ricinoleate —C R Soc Biol 1937 Vol 125 No 16 pp 231-234

Detoxication of cobra venom by oleate of sodium was noted seven or eight years ago by RENAUD he found its action to be slow the time of contact between the soap and the venom ranging between 8 and 15 days at 37°C. The author has employed for his investigations a 1 per cent stock solution of Na ricinoleate from which various dilutions are made and a 1 in 500 solution of standard *Vipera aspis* venom. The two are mixed in equal quantities kept for 24 hours at 37°C and injected.

For determination of the toxicity and coagulant action rabbits of 2,000-2,500 gm. weight were inoculated intravenously. With dilutions of the soap of 1 in 1,000 or less death resulted, with large clots in the heart and vessels with dilutions of 1 in 800 or less coagula were rare small and often confined to the portal vein. Of 13 rabbits injected with 5 lethal doses of the venom plus ricinoleate 1 in 800 12 survived. Five hours contact does not deprive the venom of its toxicity. The necrotizing power of mixtures of venom and soap was tested by subcutaneous injection of guinea-pigs dilutions of ricinoleated venom 1 600 to 1 1,200 being used and injected under the skin of the abdomen in doses of 5 cc. or 5 mgm. of dried venom. The soap weakened the necrotizing action. Thirdly rabbits were injected intravenously with 1.75 mgm. of the ricinoleate venom per kilo or two injections at a week's interval 1 week later two lethal doses 0.7 gm. per kgm. of the venom —

## MISCELLANEOUS

COLONIAL OFFICE. ADVISORY COMMITTEE ON EDUCATION IN THE COLONIES. Memorandum on the Education of African Communities.—Colonial No. 103 24 pp 1935 London H.M.S.O [6d]

The value of rural reconstruction as a means of improving the health of the mass of the people in the colonies and the importance of increased facilities for the education of girls and women so that they may play their part in promoting health in the village are matters of much concern to medical authorities to-day. The above memorandum therefore should be of considerable interest to them as the authors recognize clearly the need for co-operation between medical and educational agencies.

The memorandum deals with the education of the general mass of the population particularly those living in rural areas. Its aim is to show the educational significance of the inter-relation of all the factors in community life. "Experience of the education of rural communities in different countries tends to show that efforts to educate the young are largely wasted unless a simultaneous effort is made to improve the life of the community as a whole. Poverty, malnutrition, insanitary conditions and habits, ignorance, superstitious belief hampering traditions, are all interdependent factors, no one of which can be dealt with effectively in isolation.

There is a close connexion between educational policy and economic policy and there must be close collaboration between the agencies responsible for public health, agriculture and schools.

Teachers in African villages need to acquire in their training an interest in all that pertains to the life of the community.

Co-operative Societies may prove a valuable instrument for the advancement of African communities.

Sociological research to be undertaken by investigators who have received a thorough training in modern social and psychological science is needed.

Programmes of rural reconstruction require the combined effort of various departments under the guidance of the government of the territory. It is important to enlist the help of voluntary agencies, and Native Authorities should be related as closely as possible with the execution of the programme. The policy should be to encourage African initiative, self-help and responsibility.

The fundamental importance of the education of girls as essential for community advance is recognized. Jeanes schools are stated to be proving valuable in this matter in certain localities. "Health" the authors say, is the foundation of any improvement in the life of the individual and the community.

Health propaganda among the young will be to a large extent wasted effort unless it is linked up with a campaign conducted by the medical department among the adult members of the community and especially among women.

Finally, the lines along which progress can most hopefully be attempted are given as —

(a) The progressive transformation of existing efforts for the education and welfare of African communities by their closer correlation with other activities and their increasing integration with the whole life of the community.

- (b) The provision of opportunities for selected individuals to study the best methods of rural reconstruction.
- (c) The training of those looking forward to service in Africa by courses on rural reconstruction during their preparation or in summer schools which might also be attended by officers or missionaries on leave.
- (d) Intensive experiments in the improvement of the life of rural communities in one or more selected areas where the conditions are favourable and where the right personnel is available.

Mary G Blacklock

WILLIAMS (Cicely D) Child Health in the Gold Coast.—*Lancet* 1938 Jan 8 pp 97-102 With 4 figs Summary appears also in *Bulletin of Hygiene*

This article by a woman medical officer formerly in the Gold Coast and now in Malaya, is an abbreviation from a thesis for the D M Oxon. It gives an interesting account of the environment customs mode of life and diet of the community as they affect the health of children. It is probable that less than 50 per cent of the babies born alive survive to maturity. With a diet rich in carbohydrates and deficient in proteins fats and mineral salts malnutrition is the most serious problem, both as a direct cause of death and by preparing the soil for the acute infections. Malaria, which is very prevalent does most harm between the ages of three months and three years after which there is a gradually developing tolerance. Other important causes of ill health and death are intestinal diseases helminthiasis and pulmonary complaints. Yaws is still prevalent in rural areas but rare in the towns where treatment is readily obtainable.

- The author concludes that (1) most of the ill-health is preventable (2) the care of children in the toddler stage is of supreme importance and by the training of efficient [? African] health visitors (4) preventive work must go hand in hand with curative if the confidence of the people is to be gained (5) co-operation with the agricultural, animal health and education departments and with the administrative service is essential.

W H Peacock

ACHARD (Ch.) Voyage médical à Madagascar. A Medical Tour of Madagascar.—*Bull Acad Med* 1937 Dec. 23 101st Year 3rd Ser Vol. 118 No 40 pp 788-803 With 2 figs.

Dr Ch. Achard visited the Comoro Archipelago and Madagascar between July and September. He reports on the general organization of the Health Services and the measures taken against the chief diseases. The number of beds in hand-books as 3 853 000. Three aeroplanes are in use for transport of sick and wounded or to take medical assistance to them. The author travelled 800 kilometres in one and reports favourably on the comfort. In the last year the distance flown was 25 100 kilometres. The medical personnel consists of 56 European doctors and 302 native doctors trained at the School of Medicine at Antananarivo founded in 1896 there are also 123 m

*Average Duration of Underground Work of the Silicotics detected in the Years Considered*

Years		
1918-20	1929-32	1934/35
9 years 7 months	13 years 6 months	16 years 7 months

The mass distribution of the dust particles has been studied in terms of their size. It appears that 90 per cent of the mass is composed of particles of 4 microns and less, with main mass composed of particles of about 2 microns. This distribution has been found to hold down to 0.6 mgm. per cu. metre, and the gradual decrease of dust tabulated above has therefore been chiefly affecting the particles of size between 2.5 to 1.5 $\mu$  and it is the reduction in this range that is believed to be associated with the fall in the dust hazard, and perhaps not so much importance need be attached to the ultra-small but very numerous particles of 0.8 $\mu$  or less. With dust at 1.0 mgm. per cu. metre the most susceptible subjects have been requiring 10 years exposure so the average exposure is expected to be 20-25 years. With the increased exposure necessary to produce silicosis, the excess tuberculosis rate is becoming less marked on the Witwatersrand and it seems that bronchitis and cardiac failure in the 6th and 7th decades is taking the place of tuberculosis in the 4th and 5th as the dominant complication.

*Biochemical investigations* under Dr F. W. Fox have again centred on nutritional questions, particularly as regards vitamins. "The practical conclusions" are that when it is desired to conserve anti-scorbutic activity green vegetables should be cooked in the minimum of water or preferably steamed, potatoes should be cooked in their jackets aluminium or enamelled ware should be used in preference to copper or iron, and cooked and even raw vegetables should not be allowed to stand for longer than is absolutely necessary before being served. Many further tests have confirmed the few results of the previous year which indicated that the average Native mine labourer works with a much lower level of antiscorbutic vitamin than the average European.

*Cancer Research*—Dr DES LIGNERIS has found changes in the characters of Rous sarcoma No. 1 the Fujinami myxosarcoma and of another tumour produced in 1935. The tumours have lost their filtrability and their ability to form metastases. This has been associated with a chronic *Salmonella* infection and consequent poor quality of the fowls used for passage. Further work is being directed to the investigation of such an antagonism between tumour agent and bacterial products.

*Entomology*—Control of midges (*Chironomus*) was successfully achieved in an artificial lake in Port Elizabeth by increasing the proportion of salt water. A contrast is drawn between an area in which *A. gambiae* is the chief carrier of malaria and another in which *A. funestus* is responsible. In the former it is concluded that there is probably a cessation of mosquito-borne malaria in winter but not in the latter area. Attention is therefore drawn to the possible importance of movement of labour from a *funestus* area into *gambiae* areas as supplementing the human reservoir of infection. Two types

of sporozoites had been noted to result from dissection of *Anopheles* in distilled water. It was found that unswollen sporozoites showed a divided nucleus when stained while swollen sporozoites had a simple undivided central nucleus. It was suggested that the type with the divided nucleus represented an advanced stage of development which might be necessary before human infection can take place.

Among routine investigations two cases of *Cysticercus cellulose* of the brain are noted and a third brain cyst proved to be the cyst of *Taenia multiceps* a parasite of dogs. Of 26 histological specimens showing bilharzial ova 14 were appendices. Three additional cases of rhinosporidial infection of the conjunctiva have been added to the two previous cases.

P. H. Martin

CHAKRAVARTI (D. N.) & TYAGI (N.). Studies in "Effects of Heat."

Part I. Biochemical and Physical Changes in Ten Cases suffering from "Effects of Heat."—*Indian J. Med. Res.* 1938 Jan. Vol. 25 No. 3 pp. 791-827. With 2 figs. & 5 charts. [34 refs.]

The object of this investigation was to study the biochemical and physical changes in blood and urine in subjects suffering from effects of heat and the possible relationship between such changes and the clinical symptoms produced. The authors' biochemical findings are fully set out in a series of tables and these results are discussed and explained, but much of the information is given in a form which does not lend itself to further concentration. Their summary includes the following—

A tendency towards retention of nitrogenous constituents in the blood has been observed. This along with the increased blood creatinine and inorganic phosphates and low blood calcium figures suggests the possibility of kidney insufficiency in severe cases of heat stroke. The presence of albumin casts etc. in the urine of such cases supports the suggestion.

The low chloride findings in blood and urine reported by previous workers have been confirmed.

An increase in blood-lactic acid and other anions has been observed.

It is suggested that a possible contributory factor to hypochloremia in heat-stroke cases is the high anion concentration in blood.

In appendices there are given details of technique with illustrations of apparatus and clinical summaries of the ten cases investigated.

An extension of the investigation is promised.

W. P. MacArthur

SERRA (Giovanni). Il metodo di Maurizio Ascoli e le splenomegalie dovute ad affezioni tropicali. [Ascoli's Method of Treatment and Splenomegaly associated with Tropical Diseases.]—*Riv. Sanitaria Siciliana* 1937 Dec. 15 Vol. 25 No. 24 pp. 1431-2 1435-8 1441-4 1447-8. With 16 figs.

This paper contains a lengthy dissertation on the pathological conditions other than malaria met with in the tropics in which enlargement of the spleen and liver is a prominent symptom. In a series of such cases treated at Albertville in the Belgian Congo in which malaria, syphilis and other tropical diseases contributed to the splenomegaly the author has had considerable success in combining Ascoli's method of treatment by intravenous injections of adrenalin with the specific treatment of the disease in question. In many



cases so treated improvement was more rapid and more marked than in similar cases submitted to the usual specific treatment alone.

Norman White

LE TALLEC (C) Vingt-sept cas d'ulcères tropicaux traités par la bile de boeuf [Tropical Ulcer treated with Ox Bile.]—*Bull Soc Path. Exot* 1937 Dec 8 Vol 30 No. 10, p. 923.

The author has treated 27 cases of tropical ulcer by means of ox-bile. This is heated in a water-bath at 100°C for ten minutes is then allowed to cool and applied drop by drop to the ulcer and an ordinary dressing applied. This is carried out daily or on alternate days and in 20-30 days at most says the author healing is attained the longer period if the ulcer is of large extent. All pain ceases after 2-3 days' treatment. The treatment is simple and costs practically nothing. H H S

COSSIO (Aligi) Sympatetectomia periarteriosa nelle ulcere tropicali. [Tropical Ulcer treated by Periarterial Sympathectomy]—*Ann di Med. Var e Colon* 1937 Nov-Dec 43rd Year Vol. 1 No 11-12 pp 545-550 144 refs

The author suggests that refractory cases of *ulcus tropicum* may react well to periarterial sympathectomy on the grounds that the ulcer arises from or is kept up by inadequate blood supply. He gives brief notes of eight cases and records cure in 2 weeks to 3 months in six of them. H H S

KEEVILL (A J) Onyali. Correspondence 2—*Trans. Roy Soc Trop Med & Hyg* 1938 Mar 17 Vol 31 No 5 pp 572-573

The author puts on record details of two cases of onyali, or some condition very closely resembling it which he met with in Unyamwezi in the Western Province of Tanganyika Territory. The first patient was a girl of 10 years who had been ill for two or three days. When seen she was moribund, haemorrhagic bullae were present in the buccal mucosa and in the palatal submucosa and there was blood oozing from the mouth and nose she was intensely jaundiced. Death took place a few hours after admission to hospital.

The second was a woman of 40 years who had had a bloody diarrhoea the day before admission. She was dull, listless, the palatal mucosa was studded with haemorrhagic bullae 5-10 mm. in diameter vaginal haemorrhage came on soon after her admission, then bleeding from mouth and nose. She was treated first with Ca lactate without benefit then with injection intramuscularly into the gluteal region of 10 cc. of whole blood from her husband. The vaginal haemorrhage continued but there was no return of the bleeding per anum and no haematuria. She was three days in hospital, when the temperature was subnormal. Her friends then took her away and she was reported to have died on the next day after a total illness of five days. The disease is very rare in this district and much dreaded. There is no local name for it the term *Kafindofindo* being used for any acute inflammation of tonsils or pharynx. H H S

HORWITZ (M Thomas) & TUNICK (I) Ainhum. Report of Six Cases in New York.—*Arch Dermat & Syph* 1937 Nov Vol. 36 No 5 pp 1058-1063 With 2 figs [36 refs.]

A report upon six cases of ainhum all negroes living in Harlem New York One had migrated from the West Indies the others came from the southern States. All were between 40 and 47 years of age 4 males 2 females. The fifth toe was affected in all with bilateral involvement in one patient No evidence in regard to causation was forthcoming Clinically they were typical The radiographical picture showed constriction and rarification of the bone in varying intensity with ultimate fragmentation and absorption.

The author gives a review of the literature on the subject and a useful bibliography  
H S Stannus

LODDER (J) & MÜLLER (H) De ziekte van Winwarter Buerger [Winwarter-Buerger Disease Thromboangitis obliterans].—*Geneesk Tijdschr v Nederl Indië* 1937 Dec. 28. Vol. 77 No 52. pp 3315-3329 With 8 figs. on 2 plates English summary (5 lines)

This disease with its histological picture of obliterative thromboangitis and its clinical picture of gangrene of the extremities is not common Thirteen cases have however been observed by the authors within two years in East Java. The cause of the condition is not known but nicotine poisoning could not be incriminated in the present series of cases for the patients were not heavy smokers. Other causes of vascular obliteration and peripheral gangrene such as syphilis diabetes arteriosclerosis toxic action and Raynaud's disease were excluded before the diagnosis was decided on. Two symptoms of importance were the intense pain which might lead a patient to beg for amputation and the want of pulsation in the artery to the affected part Many remedies were tried and in one case Lenche's operation of perivascular sympathectomy but none of these gave any permanent benefit Lumbar sympathectomy was not attempted. Amputations had to be performed and well above the line of demarcation of gangrene if the gangrene was not to recur Histologically the usual picture of vessels with their lumen narrowed by organized thrombus containing purulent foci and sometimes giant cells was found. Canalization of organized granulation tissue might be seen but no elastic fibres were present in the new formed tissue within a vessel lumen in this respect thromboangitis obliterans differs from arteriosclerosis Good clinical and histological photographic illustrations accompany the article.  
W F Harvey

HAMILTON (J F) Further Report on Pseudomycosis Indolent Leg Ulcer based on a Study of 54 Patients.—*Jl Trop Med & Hyg* 1938 Jan. 1 Vol 41 No 1 pp 1-8

MOKLEY (George) Otitis Externa "Hot-Weather Ear" An Investigation of 100 Cases and a Method of Treatment.—*Brit. Med Jl* 1938 Feb 19 pp 373-377 With 1 chart. [26 refs.]

When PALMER first described this condition in 1934 [see this *Bulletin* 1935 Vol. 32, p. 73] he believed it to be of mixed ringworm and bacillary aetiology The author here analyses 100 cases seen by him

at Aden where it prevailed mainly in May-June and August-September. The author does not believe that sea-bathing plays any part in causation. The common infecting organism was *Pr. pyocyanea* not a fungus, but its source was not discovered. In the acute cases pain is intense and examination of the meatus is impossible without an anaesthetic. There is fever up to 103°F., with adenitis and the meatus is almost occluded by soggy exudate which on removal leaves a bleeding surface.

Treatment consists of gentle syringing with boric lotion as hot as can be borne, and after allowing this to drain away the meatus is filled with 1 per cent carboglycerine and the ear covered in a boric fomentation. For chronic cases, the meatus is cleared of debris, then dried with ether or boric and spirit drops after which boro-iodine powder is inserted by insufflation and the meatus closed by a wool tampon. The following is the procedure for preparing the boro-iodine powder —

For the preparation of iodized boric powder sublimed iodine is used in a strength of 1 per cent in acid boric pulp. The iodine is first broken down with a few drops of alcohol 90 per cent. The boric acid is added in powder form in small quantities as quickly as possible, using a non porous glass mortar and keeping the mixture moving all the time. As soon as the iodine appears to be evenly distributed the powder is transferred to a wide mouthed dark glass-stoppered bottle without waiting for complete drying. Evaporation of the iodine is very rapid. If any delay occurs all the iodine is lost, and the use of a glass-stoppered bottle instead of cork is necessary to preserve the iodine content." H H S

LEYVA (Jose F.) GUTIERREZ (Marciano) & MILINDALEKHA (Tong Khan). Detection of the Alkaloid of Nani (*Dioscorea hispida* Dainst) in Case of Poisoning.—*Philippine Islands Med Assoc* 1937 Nov Vol. 17 No 11 pp 693-698

One of the greatest handicaps in forensic analysis is encountered when an organic poison of the nature of an acid principle, glucosides, or an alkaloid is present in a sample whose chemical reactions are too little studied to [enable one to] draw a more or less reliable conclusion as to the real identity of the substance in question."

So write the authors and their dictum has been found to be very true in, e.g. poisoning by *Blighia sapida* where the toxic principle is probably a glucoside and there is no known test for it. In the case of *dioscorine* the toxic principle of *Dioscorea hispida* the authors have in this paper recorded their work to elucidate its detection.

It proved to be an alkaloidal substance and its toxic action was tested by intragastric administration (by stomach tube) of 0.13 gm. in 10 cc. distilled water to a *M. cynomolgus* weighing 2 kilos. The symptoms resulting were Spasm and extension of limbs, after a symptomless interval of 24 minutes with arms semiflexed, with muscular tremor. Hyper irritability preceded the clonic convulsions with opisthotonus, and open mouth, as if the animal were gasping for breath. foaming of the mouth appeared, but not vomiting or sphincter relaxation. pupils were widely dilated respiration ceased during convulsions. Death occurred 70 minutes after administration of the poison.

Tests—colour reactions and precipitation—are detailed and to the description the reader is referred. A table giving detailed colour reactions of the pure alkaloid and the recovered alkaloid will be of

great help to the toxicologist. The distribution in the various tissues and organs is given—most was present in the stomach and kidney and next in the blood—little in the intestine, liver or brain and least in the lung. Its physiological reactions simulate closely those of atropine not strychnine. The calculated fatal dose is 0.002 gm. per 30 gm. body weight. It is interesting to note that one monkey which did not receive the full calculated fatal dose was to all appearances unaffected. The same was noticed in experiments with white mice.

H H S

NELSON (C Ferdinand) & STOKER (Ruth) The Hemoglobin Concentrations and Erythrocyte Counts of Healthy Men.—*Folia Haematologica* 1937 Vol 58. No 3/4 pp 333-354 With 4 figs. '43 refs.'

The paper opens with a comprehensive table which summarizes the maximum, minimum and average haemoglobin values and erythrocyte counts found by previous investigators and indicates the respective methods employed in making the haemoglobin determinations and wherever possible the occupations of the subjects examined. With few exceptions previous observations have been made on narrow and restricted sections of the population. To overcome objections on this score the present authors drew their material from as widely different social strata as possible and from three different localities in Kansas, namely from a metropolitan area, from a suburban community and from a military reservation—the elevation of these places varied from 700 to 1 000 feet above sea level. All of the 350 men chosen had repeated physical examinations and at the time the blood was examined were in good health.

Blood was drawn from an arm vein and 2 mgm. of potassium oxalate added as an anticoagulant for each cc. of blood collected.

The haemoglobin was determined by the van Slyke oxygen capacity method on 2 cc. samples of thoroughly aerated blood. For the entire group of 350 men the maximum concentration was 18.39 gm. per 100 cc. blood, the minimum 12.35 gm. and the average 15.03 gm. The maximum values of each of the 13 sub-groups and of the combined group were fairly close and the authors conclude that with few exceptions 18 gm. of haemoglobin per 100 cc. blood represents the maximum concentration compatible with health in adult American men. The agreement of the minima was not so close but even in the lowest cases nothing could be found to suggest any abnormality or pathological state and the authors feel that WINTROBE's minimum of 14 gm. is too high by at least 1.5 gm.

The red cell count of the larger group varied between 6.70 and 4.03 million cells per cmm. with an average count of 5.11 millions. Five of the smaller groups had maximum values of 6.0 millions and more cells so that this value certainly seems to be within the range of good health which agrees with certain other American observers. The minimum red cell counts like the haemoglobin concentrations showed greater variations and several of the smaller groups had minimum values around 4.25 millions. Similar values have been found by other investigators and did not seem to be associated with any deviation from good health. These apparently normal cases with low counts are important and should receive careful attention—only

repeated examinations over long periods of time will determine just how low a cell count may be compatible with good health.

There appeared to be no significant differences either in haemoglobin concentrations or in red cell counts between urban residents and those living in suburban or in country communities nor between men working out of doors and those working inside. No significant differences were observed between the values obtained for healthy male negroes and those for healthy white males.

The average haemoglobin concentration for men between the ages of 18 and 25 was slightly lower than for men in all the other age groups but between 25 and 65 there did not seem to be any significant differences in haemoglobin values due to age. There were no significant differences in red cell counts between the ages of 18 and 65.

Traffic officers and motor cycle policemen who spent their entire working day in the congested traffic districts of Kansas City did not as a group have higher maximum or average haemoglobin values or greater cell counts than suburban groups investigated.

*F Murgatroyd.*

SOKHEY (S S) GOKHALE (S K) MALANDKAR (M A) & BILLIMORIA (H S) Red Cells, Haemoglobin Colour Index, Saturation Index, and Volume Index Standards. Part I. Normal Indian Men: a Study based on the Examination of 121 Men.—*Indian J Med Res.* 1937 Oct Vol 25 No 2. pp 505-528. With 8 figs. [23 refs.]

While studying the blood conditions in sprue the authors came up against the fact that they had no normal standards for Indians with which to compare their pathological findings. Indeed the situation was not much better for Europeans either if the authors' suggestion is correct that the figures for average normal counts (5 000 000 for men and 4 500 000 for women) have been quoted from one text-book to another without proper confirmation and were originally based upon the examination of only four bloods.

When the authors began work in 1929 the only reliable figures available were those of OSGOOD (1926) who employing accurately standardised methods made determinations on 137 American men between the ages of 19 and 30 years. The same methods except for the haemoglobin determination were closely followed in the present investigation in which examinations were made on oxalated venous blood obtained from 121 healthy young men between 19 and 30 years of age of the Bombay Presidency.

The average values obtained were red cell count 5.11 millions per cmm, haemoglobin 15.37 gm per 100 cc. blood and cell volume 41.72 cc. per 100 cc. blood. The haemoglobin determinations were made by van Slyke's oxygen capacity method, but Newcomer's method in which the haemoglobin is converted into acid haematin and compared against a yellow glass disc was found to give close agreement and to be more convenient for clinical work. The figure for cell volume is the average of those actually obtained but the question of the shrinkage of cells in oxalated blood is discussed.

Considerable number of tables and figures is given and should be consulted by those interested.

*F Murgatroyd*

SOKHEY (S S) GOKHALE (S K) MALANDKAR (M A.) & BILLIMORIA (H S) Red Cells, Haemoglobin Colour Index Saturation Index and Volume Index Standards. Part II. Normal Indian Women a Study based on the Examination of 101 Women.—*Indian J Med Res* 1938 Jan Vol. 25 No 3 pp 723-739 With 8 figs. [16 refs.]

In the haematological examinations of 101 healthy young women medical students or nurses between the ages of 16 and 30 years from the Bombay Presidency the authors used the same methods they employed in their previous investigation into the normal haematology of Indian men (see above) Venous blood to which was added neutral potassium oxalate (2 mgm. per cc.) was used and in the case of the cell volumes the actual figures obtained without correction for shrinkage have been recorded the haemoglobin was determined by van Slyke's oxygen capacity method

The diets of the women varied but no significant differences were found between vegetarians and those on mixed diets None was pregnant and no attention was paid to the menstrual cycle

The red cell counts ranged from 3.50 to 5.35 millions with a mean value of 4.47 millions per cmm the haemoglobin from 10.46 to 16.01 grammes with a mean of 12.99 grammes per 100 cc blood and the cell volume from 28.40 to 44.67 cc. with a mean of 36.27 cc. per 100 cc. blood. The average size of red cells in men and women appeared the same

F Murgatroyd

SANKARAN (G) & RAJAGOPAL (K.) Haematological Investigations in South India. Part I. The Estimation of Haemoglobin.—*Indian J Med Res* 1938 Jan. Vol 25 No 3 pp 741-751 With 1 graph [25 refs.]

Haemoglobin determinations of 125 male students and young doctors between the ages of 18 and 25 years and 62 women students between the ages of 17 and 22 in Madras were made All subjects were apparently in good health and there was no reason to suppose that any was suffering or had recently suffered from malaria or helminthic infections

The haemoglobin was determined in the following manner — 5 cmm. of blood from the finger was lysed in 10 cc. of distilled water 0.5 cc. of this solution was mixed with 1 cc. of 1 per cent. benzidine reagent (1 gm. purified benzidine crystals 20 cc. glacial acetic acid, 30 cc. distilled water 50 cc. absolute alcohol) and then 0.5 cc. of 2 per cent. hydrogen peroxide was added The mixture was shaken and then allowed to stand from 1 to 1½ hours during which time a purple colour developed 10 cc. of 20 per cent. acetic acid was then added and then after mixing the colour of the mixture was compared colorimetrically with that obtained from a standard solution of haemoglobin treated in the same way The haemoglobin content of the standard had been determined by van Slyke's oxygen capacity method.

The average haemoglobin value of the males was 16.57 gm. and of the females 13.73 gm. per 100 cc. of blood.

F Murgatroyd

SANKARAN (G) & RAJAGOPAL (h.) Haematological Investigations in South India. Part II. The Effect of the Administration of Iron on the Haemoglobin Level in Indian Girls and Young Women. —*Indian J Med Res* 1938 Jan. Vol 25 No. 3 pp. 753-761 With 1 chart.

In a mission school 24 girls were given iron and 24 acted as controls the ages varying from 10 to 16 years the groups were further subdivided into subgroups of 12, one of which was composed of girls who had not menstruated and the other of girls who had. All appeared healthy and there was no history or evidence of recent serious illness, helminthic infection or malaria. The daily intake of total iron per consumption unit was estimated at about 23 mgm. In a women's college two similar groups of 24 one to receive iron and the other to act as control were also examined. All these subjects had reached puberty and were in good health the ages ranging from 16 to 22 the total daily intake of iron per consumption unit was calculated to be about 25 mgm to 30 mgm.

Six grams of ferrous sulphate were given daily for 4 weeks to the 24 girls in the mission school, and a similar dose for 6 weeks to the 24 women in the college three subjects had mild nausea with the ferrous sulphate which was then replaced by a mixture containing 30 grams Ferri et ammon citras given twice daily.

Haemoglobin estimations were made by means of the benzidine method described in the previous paper. A rise in haemoglobin was observed after 2 weeks of iron medication. In the first group the initial mean haemoglobin level was 16.35 gm. whereas after iron had been given for four weeks the mean level was 20.34 gm. per 100 cc. blood. In the college the levels before and after the administration of iron for six weeks were respectively 13.69 gm. and 18.44 gm. per 100 cc. blood.

Controls not receiving iron did not show similar increases. It might be argued that a higher haemoglobin content of the blood is advantageous in that it facilitates transport of oxygen and may lead to greater efficiency of tissue metabolism but there were no obvious changes in the girls given iron.

The haemoglobin content was found to have returned to the original level two months after the administration of iron had been discontinued. The initial haemoglobin levels observed in this investigation and the levels attained after iron administration are higher than those recorded by other observers.

No differences were found in the haemoglobin content of the blood of girls who had and those who had not attained puberty or during menstruation or in the inter-menstrual period. F. Margatroyd

NAPIER (L. Everard) & GUPTA (P. C. Sen) Sternum Puncture. I. The Findings in Normal Indians. —*Indian Med Gaz.* 1938 Jan Vol 73 No 1 pp 1-7 With 3 figs & 1 coloured plate.

Puncture is made with a stout needle and stylet just to one side of the mid-line at the level of the 3rd intercostal space after local infiltration down to the periosteum with novocain. The operator feels a loss of resistance as the needle enters the marrow cavity the depth of puncture may also be controlled by an adjustable guard clamped on the needle about  $\frac{1}{4}$  to  $\frac{1}{2}$  an inch from the point. After

removing the stylet 2 cc (which seems an undesirably large amount of marrow blood is aspirated by means of a syringe during which the patient feels a dragging pain. Finally the skin puncture is sealed with collodion.

The findings in 10 normal male Indians are summarized and discussed in relation to the bone marrow cytology according to different observers. (These observers' figures are summarized in a table in which presumably the majority of the figures represent percentages although no indication is given.

F. Margatroid

NAPIER (L. Everard) & BILLIMORIA (H. S.) Haematological Studies in Indians. Part VIII. Analysis of the Haematological Findings in 52 Cases of Anaemia amongst Pregnant Tea-Garden Coolie Women. — *Indian J. Med. Res.* 1937 Oct. Vol. 25 No 2. pp 529-545 With 1 chart.

Haematological records were made of 60 "normal" (that is no obviously anaemic) coolie women. Of these 40 were pregnant, but no significant difference was obtained between the non-pregnant and pregnant.

The authors then examined a series of 52 anaemic pregnant women and drew the following conclusions —

"The anaemia in these pregnant women is of two main types — one is a hypochromic microcytic anaemia caused mainly by hookworm infection though possibly exaggerated by other factors including pregnancy the other is a hyperchromic macrocytic anaemia in which the pregnancy itself appears to be an important causative factor and which is associated with splenic enlargement but not with hookworm infection.

"There is also a group of cases in which the haemoglobin is almost within the normal range but in which the size of the cells is large — this type is apparently aetiological similar to the severe type of macrocytic anaemia and is associated with the pregnancy but it may be looked upon as an almost physiological anaemia of pregnancy. Finally there is a small group of cases of a normocytic anaemia of a moderate degree of severity which differs from each of the other two types in some particulars and which is possibly a combination of the two types.

F. Margatroid

BASU (Charu Chandra) & CHATTERJEE (Hemendra Nath) Studies on the Normal Haematology of Women Living in Bengal. — *J. Indian Med. Assoc.* 1937 Oct. & Nov. Vol. 7 Nos 1 & 2. pp 1-7 61-68 With 3 figs. [41 refs.]

In studying the normal haematology of Bengal the authors examined only those persons who were performing their normal avocations of life without any discomfort and who were not suffering from any visible ailment. Two series were examined. One was an unselected group of 80 women belonging to various races — Bengalese, Hindustanis, Punjabis and Marwaris living in various parts of Calcutta, the age varying from 16 to 53 years — several of these exhibited sub-normal figures. The other was a group of 56 selected and healthy young Bengalese girls living in the southern part of the city their ages varying from 16 to 23 years. For comparison the available figures for normal males obtained in the same country by Basu and Chatterjee (1934) and by NAPIER and DAS GUPTA (1935) (see this *Bulletin* 1936 Vol. 33 p 75) are also given.



In Part I the authors record the results of their examinations of the erythrocytes and the haemoglobin. The average figures for the two series were respectively, red cells 3.6 and 3.9 millions per cmm., haemoglobin 13.4 and 13.5 gm. per 100 cc. and corpuscular volume 32 and 36 per cent. The sedimentation rate the percentage of reticulocytes and the corpuscular dimensions were also determined.

In Part II the figures for the white cell counts are recorded.

The average leucocyte counts for the two series were 7,200 and 6,908 per cmm. respectively.

The classification of SCHILLING was followed for the differential count and the majority or 78 per cent. of the apparently normal females showed a greater percentage of immature polymorphs than the normal European figure. The authors were led to the conclusion that for Bengal women the polynuclear blood picture may be regarded as normal when the relative proportions of mature to immature polymorphs is 3:1 or greater.

More than half of the total cases had an eosinophilia greater than 6 per cent. and in the first series the average eosinophilia was 9.6 per cent.

Seventeen cases showed a relative lymphocytosis of 40 per cent. or more. In some instances this was associated with a leucopaenia and since the authors feel that the absence of fever of splenomegaly of mononucleosis and of any shift to the left of the neutrophils precludes kala-azar they ask whether such blood pictures signify a pre-tubercular stage. [Pre-tubercular presumably means incipient infection.]

F. Margatroyd.

NAVARRO (Regino J.) Hematology in Filipinos. II. Normal Mean Corpuscular Volume, Mean Corpuscular Hemoglobin and Mean Corpuscular Hemoglobin Concentration the Various Normal Blood Indices.—*Philippine Islands Med Assoc* 1937 Oct. Vol 17 No 10 pp 611-620 [16 refs.]

Examinations were made of 138 samples of oxalated venous blood obtained from 135 healthy Filipino adult males and females.

The haemoglobin value of each sample was derived from a determination of its iron content while the volume of packed cells per 100 cc. blood and the red cell count per cmm. were determined by the usual methods. The averages of these absolute values were for men and women respectively.—haemoglobin 14.11 gm. and 12.61 gm. per 100 cc. volume of cells 43 per cent. and 38 per cent. and the cell count 5,160,000 and 4,530,000 per cmm. From these determinations were calculated the mean corpuscular volume the mean corpuscular haemoglobin and the mean corpuscular haemoglobin concentration, and the limiting values were also expressed as indices representing fractions of the respective means.

The various figures are compared with those obtained by different American workers and after applying shrinkage corrections, volumes of packed cells show close agreement but wider differences, for which variations in technical procedures are probably partly responsible, were found for the mean corpuscular volumes. On the other hand, geographical and racial factors were thought to play a greater part than technical procedures in the differences between the haemoglobin contents and concentrations of the various series [see this *Bulletin* 1938 Vol. 35 p. 82].

F. Margatroyd

KENNEDY (Walter P) *The Leucocyte Picture in Iraq*—*Trans Roy Soc Trop Med & Hyg* 1937 Nov 30 Vol. 31 No 3 pp 309-332. With 1 fig [48 refs.]

The differential leucocyte count and the polynuclear index of 400 carefully controlled healthy persons in Iraq were compared with standard text book figures for temperate climates. It was found that the percentage of neutrophils was lower and the percentages of eosinophils lymphocytes and monocytes were higher in the Iraq group the mean figures for this group being approximately polymorphs 57 eosinophils 4 lymphocytes 26 monocytes 13 per cent. and the polynuclear index 1.86.

The ranges of normal variation were also much wider than those given in the available text-books. The incidence of so-called abnormal cells was also greater and this was taken to be evidence of irritability or greater activity of the haemopoietic system a contention supported by the deviation of the polynuclear index. In the absence of other obvious factors it was concluded that the likeliest agent which might be responsible for the alteration of the blood picture was climate.

In malaria tuberculosis leprosy phlebotomus fever and bilharziasis the blood picture differed significantly from the control group and the polynuclear index compared with that of the normal group showed a shift to the left.

Embracing all stages of malaria a typical blood picture could not be defined but it was possible to say that for Iraq at least monocytosis could not be taken as a diagnostic character of that disease.

Considerable differences depending perhaps on the stage and extent of the lesions were found in the differential counts of tuberculous cases. The ranges of variations seemed greater than those of similar cases in Britain and the polynuclear count compared with a British group of tuberculous patients was significantly deviated to the left.

In cases of leprosy relative lymphocytosis was characteristic and in this group basophils were commoner than in other groups.

In phlebotomus fever there was a neutropenia and monocytosis while a striking character was the large proportion of cells which showed degenerative changes. There was an exceedingly low polynuclear index the deviation to the left being greater in this than in any other group.

The characteristic reaction in bilharziasis was an eosinophilia, the mean reaching 26 per cent. which in the absence of any marked leucocytosis appeared to be at the expense of the other cells. The neutrophils were diminished and the index deviated significantly to the left but less so than in any of the other groups.

F. Murgatroyd

CARDOZO (W. Warrick) *Immunologic Studies of Sickle Cell Anemia*.—*Arch Intern Med* 1937 Oct. Vol. 60 No 4 pp 623-653. With 6 figs. [61 refs.]

A total of 1570 patients in Chicago was tested for sickling of the red blood cells the first 800 by means of the well known cover glass and slide method only and the remainder in addition by the Beck and Hertz method in which the shape assumed by the cells after standing in equal parts of physiological saline and 3 per cent sodium citrate solution under paraffin is fixed by formaldehyde.

FOURNIER (J) Présence de lamblies dans la bile provoquée après cholécystectomie [Lamblia in the Bile after Cholecystectomy].—*Bull Soc Path Exot* 1937 June 9 Vol. 30 No. 6. pp. 476-478.

The author describes a case in which he discovered *Lamblia* in the fluid from the duodenum after cholecystectomy had been performed. The flagellates were most numerous in the third sample of fluid withdrawn and it is presumed that the flagellates had been washed from the bile ducts. In discussion DESCHENS whose experience with this kind of evidence entitles him to speak with authority points out that rarely if ever has anyone found *Lamblia* by direct observation in the gall bladder or bile ducts of cases which were known to harbour the flagellates in the intestine and which had subsequently been operated upon or had been examined post mortem. He considers that a duodenal infection may cause a secondary or reflex hepatic symptomatology.

C M W

DREYFUS (Jules R.) Lambliogène Addisonisme. [Addison's Disease due to *Lamblia*.]—*Wien Klin Woch* 1937 Aug 6 Vol. 50 No. 31 pp. 1153-1155 With 1 chart [12 refs]

A patient showing symptoms of Addison's disease was found to have a very heavy *Lamblia* infection of the duodenum. It is concluded that a toxin generated by the *Lamblia* had acted adversely on the suprarenals. This conclusion is supported by lengthy arguments which can only be followed by reading the paper in detail.

C M W

HEGNER (Robert) & ESKRIDGE (Lydia) Persistence in Rats of Human Intestinal Trichomonad Flagellates.—*Amer J Hyg* 1937 July Vol. 26 No. 1 pp. 124-126

— & — The Influence of Bile Salts on *Giardia* Infections in Rats.—*Ibid* pp. 124-134 [2 refs]

Having available a colony of trichomonas-free rats the authors tested the susceptibility of a number of these animals to human trichomonads by administering cultures by the mouth. It was found that infection occurred even after a single dose and that this was maintained for long periods, in one case for over a year. It would appear therefore that rats in nature may become carriers of human trichomonads and thus be sources of infection for man.

In the second paper it is stated that feeding experiments show that a diet of liver is very favourable to the growth and persistence of human trichomonads in the caecum of rats, as tested by killing the rats and estimating the number of these flagellates in the caecum.

C M W

DE MURO (P) Trichomoniasi intestinale a sindrome d'enterocolite muco-membranosa. [*Trichomonas intestinalis* as a Cause of Mucosmembranous Colitis].—*Polisimico Sex. Med.* 1937 Sept. 1 Vol. 44 No. 9 pp. 425-440. [115 refs]

This is a very long paper on the subject of the pathogenicity of *Trichomonas hominis* which it is concluded can give rise to three forms

of muco-membranous entero-colitis—simple febrile and cachectic. Treatment recommended is the oral administration of yatren and enterovioform. The paper concludes with an extensive bibliography.

C M II

JERACE (Felice) Un caso di enterite da *Spirochaeta intestinalis* associato con *Trichomonas intestinalis*. [*Spirochaetal Enteritis Associated with Trichomonas.*]—*Giorn Ital di Clin Trop* 1937 Sept. 30 Vol 1 \ S No 9 pp 266 269-70 With 1 fig

In a case of enteritis both spirochaetes and trichomonas were present in the faeces. It is concluded that these organisms are responsible for the condition.

C M II

PAULSON (Moses) The Numerical Determination of *Trichomonas hominis* in Urine and its Practical Implications in Genitourinary Parasitism.—*Jl Lab & Clin Med* 1937 Mar Vol 22. No 6 pp 646-650

The author has demonstrated that an estimation of the number of trichomonas present in cases of urinary infection can be made by counting in the haemocytometer after the flagellates have been immobilized by the addition of a couple of drops of one per cent solution of formalin to 5 cc. of urine.

C M IV

BLAND (P Brooke) & RAKOFF (A. E.) The Incidence of *Trichomonads* in the Vagina, Mouth and Rectum. Evidence that Vaginal *Trichomonads* do not originate in the Mouth or Intestine.—*Jl Amer Med Assoc* 1937 June 12. Vol. 108 No 24 pp 2013-2016 [27 refs]

The authors studied the infection rate of trichomonas amongst 200 women at an ante and post natal clinic. All available methods (direct examination film staining culture) were applied to determine the presence of flagellates in the mouth intestine and vagina. A vaginal infection was present in 23.5 per cent, a buccal infection in 16.5 per cent, and an intestinal infection in 1.5 per cent. From the figures obtained it did not seem probable that these infections were of the same type and that vaginal infections were of intestinal or buccal origin or that intestinal infection had followed a buccal infection. It appeared that *T vaginalis* which was not cultivable at room temperature as were the other forms was physiologically distinct.

C M W

SMITH (T) & KOSTITCH (D) Rôle de la mouche domestique dans la propagation du *Trichomonas intestinalis* chez l'homme. [*Rôle of the House Fly in Spread of T intestinalis in Man.*]—*Ann Parasit Humaine et Comparée* 1937 July 1 Vol 15 No 4 pp 323-325

In a series of experiments in which house flies were allowed to feed on cultures of trichomonas and then on fluids which were transferred to culture media it was demonstrated that the flies were capable of contaminating these liquids with living flagellates. The conclusion is that house flies are responsible for the spread of the human trichomonas.

C M W

CORRADETTI (Augusto) I distomi parassiti dell *Anopheles maculipennis* [Distomes Parasitic in *Anopheles maculipennis*].—*Riv di Parassit.* Rome 1937 Jan. Vol. 1 No. 1 pp. 39-51. With 2 text figs & 12 figs on 2 plates (14 refs.) English summary (4 lines)

During the dissection of anopheles various observers have encountered in the abdomen and thorax encysted distome trematodes which have been placed in the genus *Ayamodistomum*. They have been found in *A. maculipennis* in Europe as well as in anopheles in India. The author discusses the literature on the subject and comes to the conclusion that there are four species three in Europe and one in India. One species *Ayamodistomum neurogangliorum* is a new species from Italy. C. M. W.

IVANIĆ (Nontilo) Ueber einen Protoplasmakörperparanten von *E. amoeba histolytica* Schaudinn (*Entamoebophaga hominis* gen. nov. spec. nov.) [An Intracellular Parasite of *E. histolytica*].—*Zent f. Bakt.* 1. Abt. Orig. 1936. Dec. 10 Vol. 138 No. 12 pp. 48-56. With 38 figs on 1 double plate

The author was examining certain iron-haematoxylin-stained preparations he had made of *E. histolytica* in faeces when he noted that within certain of the amoeba was another amoeboid organism. The growth of this was traced from a small uninnucleate body to a large multinucleate cytoplasmic mass occupying nearly the whole of the interior of the amoeba. In the surrounding medium were also free forms of this organism, large plasmodial masses and cysts containing four or more products of division. The organism, which is allied to the Mycetozoa is given the name *Entamoebophaga hominis*, n. g. n. sp. The appearances of the new parasite are shown in a plate of 38 figures. It is evident that this organism, which has been seen by no other worker requires further investigation. C. M. W.

NEWIADOMSKI (M. M.) Blastocystentumoren. [Blastocystis Tumours].—*Zent f. Bakt.* 1. Abt. Orig. 1937 Jan. 15 Vol. 138 No. 34 pp. 244-249. With 5 figs

The paper describes the occurrence of ultramicroscopic stages of development in cultures of *Blastocystis*. These are said to pass a Seitz or Chamberland ( $L_2$ ) filter and to yield, in the course of a month or so in fresh medium cultures of typical *Blastocystis*. From cultures of the organism enclosed in collodion sacks inserted in the subcutaneous tissues of rats, the ultramicroscopic forms pass into the tissues and become transformed into cells which resemble cells of the tissues of the animals. They give rise to tumours consisting of atypical polymorphic cells. C. M. W.

CARRERA CALDERÍN (César) El *Blastocystis hominis* como parásito patógeno del hombre (*Blastocystis hominis* Pathogenic for Man).—*Riv. Med. Trop. y Parasit.* Habana 1937 May-June. Vol. 3 No. 3 pp. 207-213.

The paper is a lengthy argument in favour of regarding *Blastocystis hominis* as pathogenic and responsible not only for local intestinal symptoms but also for others of a more general character such as debility, anaemia and urticaria. C. M. W.

PUBLIC HEALTH REPORTS 1937 Mar 19 Vol. 52. No 12 pp 334-338—Coccidioidal Granuloma.

Coccidioidal granuloma a disease due to a fungus *Coccidioides immitis* attacks the pulmonary osseous cerebrospinal and cutaneous systems in the order mentioned Other tissues of the body with the exception of the gastro-intestinal tract may also be affected Cutaneous lesions may be primary (papules nodules pustules vegetating papillomas verrucous lesions) or secondary (subcutaneous nodules tumours abscesses ulcers) The disease occurs in both man and animals and is specially prevalent in central and southern California Up to July 1st 1936 450 cases had been noted in California with 224 deaths There appears to be no case to case infection and the theory that the disease is soil borne is probably correct The parasite is a double contoured organism with a refractile capsule Reproduction is by endogenous spore formation  
C M II

DICKSON (Ernest C) *Coccidioides* Infection. Part I—*Arch Intern Med* 1937 June Vol. 59 No 6 pp 1029-1044 With 4 figs [17 refs]

The author points out that the disease coccidioidal granuloma is really the advanced or terminal stage of an infection which has rarely been recognized in the acute stage Inhalation of the spores of the causative fungus may be followed by broncho-pneumonia and erythema nodosum The paper gives an account of culture of the fungus and the various forms it assumes  
C M IV

KRAJIAN (Aram A.) A Rapid and Economical Method for staining Routine Tissue Sections with Hematoxylin and Eosin.—*Arch Pathology* 1938 Mar Vol 25 No 3 pp 376-377

The following will be of interest to pathologists in the tropics where the saving of alcohol in laboratory procedure is important

The most difficult stage in the time-honoured method of tissue staining with haematoxylin and eosin is the counter-staining and subsequent dehydration because of reduction of the degree of eosin staining in the succeeding steps of the procedure The modification proposed consists in carrying out the dehydration before counter-staining with eosin dissolved in carbolxylene eosinol There is no decolorization by the subsequent treatment of the section Details of the preparation of the stain and of the method of procedure are given by the author as follows —

#### *Preparation of Eosinol*

Dissolve 5 gm of aqueous eosin in 10 cc of distilled water Precipitate it by adding 10 cc. of glacial acetic acid and mix with a glass rod Incubate the resulting coagulum at 56°C for from twelve to sixteen hours or until all the water has evaporated

"Dissolve this dehydrated acid-eosin in 10 cc of absolute alcohol and 20 cc. of acetone stirring with a glass rod for several minutes Let the undissolved portion which is to be discarded settle to the bottom of the container (about ten minutes) Remove the clear portion with a clean dry pipet add it to 1,500 cc. of carbolxylene (1 part pure phenol crystals in 3 parts of neutral xylene) Some precipitate will form, which will settle to the bottom of the container The clear portion is eosinol The solution keeps indefinitely

"Owing to variation in the staining power of the various brands of powdered eosin it may be necessary to standardize the solution by staining control sections and adjusting the strength of the eosinol by reducing or increasing the amount of carbokyleno

#### *Staining Method*

- 1 Prepare microscopic sections by one of the standard sectioning methods (i.e. employing frozen tissue or tissues embedded in paraffin or pyroxylin) and stain in alum-hematoxylin (Harris-Delafield) for from three to seven minutes
- 2 Wash in tap water until blue (about thirty seconds)
- 3 Destain in acid-alcohol (1 cc. of concentrated hydrochloric acid in 99 cc. of 70 per cent. alcohol) by dipping the section in and out for even destaining
- 4 Rinse in tap water
- 5 Blue by dipping in 2 per cent. ammonia water (2 cc. of strong ammonium hydrate in 98 cc. of tap water)
- 6 Wash in tap water for a few seconds
- 7 Wipe off the water with a towel, dehydrate in 95 per cent. alcohol for one minute and wipe off the back of the slide.
- 8 Dehydrate completely by pouring on a few drops of absolute alcohol from a drop bottle. Repeat
- 9 Counterstain and partially clear in eosinol for from ten to thirty seconds depending on the strength of the solution
- 10 Treat with carbokyleno for three minutes
- 11 Treat with first xylene two minutes.
- 12 Treat with second xylene two minutes
- 13 Treat with third xylene two minutes
- 14 Mount in gum dammar (saturated solution of gum dammar in neutral histologic xylene)"

H H S

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**BRITISH MALAYA**

*Introductory.*—The year 1936 saw published for the first time under one cover the Annual Medical Reports for the Straits Settlements and the Federated Malay States this action constituting the first step towards a Pan Malayan Medical Report for the time is not yet ripe for the inclusion of the Reports of the Non Federated Malay States. The Report under review contains a series of admirable illustrations of phases of medical life and work in Malaya.

The reader may be reminded that in 1932 the staffs of the Straits Settlements and Federated Malay States Medical Services were amalgamated to form the Malayan Medical Service under the Director Adviser (see this *Bulletin* 1934 Supp p 123\* and 1935 Supp p 145\*). Officers of the Medical Service are liable to serve either in the Straits Settlements or in the Federated Malay States. In order to facilitate reference to corresponding summaries published in previous issues of this *Supplement* it is proposed to follow former practice by discussing the respective areas separately as hereafter

**FEDERATED MALAY STATES (1936)**

The Federated Malay States are situated on the mainland of the Malay Peninsula closely connected with the Straits Settlements. They comprise four States Perak, Selangor, Negri Sembilan and Pahang. The total area is 27 648 sq miles. The principal towns are Ipoh, Taiping, Kampar and Teluk Anson in Perak, Kuala Lumpur and Klang in Selangor and Seremban in Negri Sembilan.

*Vital Statistics.*—The mid year population estimated by the balancing equation method was 1,847,951. It is stated that the excess of immigration over emigration had considerably less influence on vital statistics during the period under review. The racial distribution of the population reads as follows—

State	Malays	Chinese	Indians	Non-Asiatics	Others	Totals
Perak	334 683	347 151	168 768	3 032	6 459	830 093
Selangor	137 116	260 256	164 842	3 594	9 967	575 775
N. Sembilan	96 402	97 750	51 481	1 063	3 155	249 853
Pahang	119 456	55 920	14 989	474	1 391	182 230
Totals	687 657	761 077	400 080	8 165	20 972	1,847,951

*Registered Births* numbered 71,504 giving a crude birth rate of 38.7 per 1 000 persons. The increase in the birth-rate is shared by all races but is most marked for Malays the rates reading Malays 43.4 Chinese 38.5 Indians 33.3 Non Asiatics 14.9 and Others 9.1 respectively.

*Registered deaths* numbered 35 528 with a crude death rate of 19.2 per mille. The distribution of death-rates by race shows that the highest rate 21.5 per 1 000 occurs among Malays then in descending order appear Chinese 18.5 Indians 18.0 Others 5.6 and Non Asiatics 3.4.



*The Infant Mortality Rate* shows a further decline from 144 per 1 000 births in 1935 to 142 per 1,000 in 1936. The improvement in Infant Mortality among Malays in Perak during 1935 was not maintained for during 1936 the rate rose to 162 per mille a localized rise which cannot be explained for a decrease is recorded for Malays in all other States. Chinese in Perak record the lowest rate of 123 per 1,000 and are followed by Indians in Selangor and Malays in Negri Sembilan each with a rate of 129 per 1 000 births.

The numbers of *labourers on estates* were less than in previous years, viz. 159 431 the distribution of the labour force by States and the corresponding deaths and death-rates are set out in the following Table —

State	Labour Force	Deaths	Death Rates
Perak	51 713	347	6.7
Selangor	57 716	351	6.1
N. Sembilan	37,290	296	8.0
Pahang	12,712	114	9.0
Totals	159 431	1 110	7.0

*Maternity and Child Welfare Work.*—At all Government Hospitals provision is made for dealing with maternity cases. Maternity Wards are reserved for Malay women at the General Hospital Kuala Lumpur and there are also Maternity hospitals supported by the Chinese Communities in Selangor, Perak, and Negri Sembilan. Official Returns record 8,836 cases treated for conditions associated with pregnancy, childbirth and the puerperal state and of these 7 146 were normal labour cases. *The Training of Midwives* was continued in all the four States at Government Hospitals the majority of trainees are Malays with Chinese at the Chinese Maternity Hospitals. The successful candidates are posted to selected kampongs where infant mortality is highest. It is stated that trained midwives are gradually eliminating the untrained *bidans* throughout the States but there is urgent need for better midwifery amongst the Tamil population.

There are 16 *Infant Welfare Centres* distributed as to 3 in Perak, 9 in Selangor, one in Negri Sembilan and 3 in Pahang. These centres are controlled either by a Lady Medical Officer or by a Health Sister with Health Visitors and trained midwives (see this *Bulletin* 1937 Supp. p. 156\*). Custom and prejudice are gradually being overcome and Malay women are attending the Clinics in increasing numbers.

*School Hygiene.*—Schools are regularly visited by Health Officers, Lady Medical Officers, and Health Inspectors and pupils medically examined. During the year under review 1,301 visits were paid to 685 schools, 57,214 children were examined, and the principal findings expressed as percentages of total defects noted recorded as follows —

Defect	Perak	Selangor	N. Sembilan	Pahang
Dental diseases	26.0	23.69	63.75	47.36
Skin diseases	5.3	7.06	16.36	10.66
Eyes defects	0.2	1.28	2.66	2.53
Spleen enlargements	5.6	12.7	11.69	9.71
Fedicalous	2.9	7.23	12.56	2.17

Hygiene is taught in all schools and teachers are required to pay particular attention to the health and cleanliness of their pupils.

The Senior Dental Surgeon treats children of school and pre-school age at his Kuala Lumpur clinic and also visits children in schools and kampongs in rural areas. Towards the end of the year an additional Dental Officer was appointed in Perak.

*Public Health Sanitation etc.*—It is said the general health of the community during 1936 showed no unusual features no new constructional works of any magnitude were undertaken.

There is nothing new to record with regard to the methods of *sewage disposal* (see this *Bulletin* 1936 Supp. p 153\*) except perhaps to add that in suitable localities particularly in villages every opportunity has been taken to extend the effective method of sewage disposal by the use of tube latrines. Water supplies are generally satisfactory bacteriological and chemical tests show a high standard of purity though again it is noted that the purity of the water at Pekan is below standard (see this *Bulletin* 1937 Supp. p 157\*). A new purification plant was brought into use at Kuala Pilah, Negeri Sembilan in May and has proved very satisfactory.

*Housing and Town Planning* matters receive close attention and the work of demolition of insanitary dwellings and slum clearance was continued in the large towns. Routine house-to-house inspections are carried out regularly in all Sanitary Board areas and progress is reported in dealing with overcrowded areas ventilation and general sanitation.

*Estates and Mines* were regularly visited by Officers of the Health Branch usually with the willing co-operation of estate and mine authorities who realize the economic value of improved health conditions on their properties. The death rate of labourers showed a slight increase but this is attributed to some extent to the low powers of resistance possessed by new immigrants (see above *Vital Statistics*). Health Officers continued their visits and supervision of labourers in the employ of Government the general health of these was reported to be satisfactory. The Railway Health Officer and his staff are responsible for health conditions of the F.M.S. Railway and for the medical treatment of all railway employees during the year 28 676 patients were dealt with.

The close supervision of Health Officers of *restaurants food factories bakeries* etc. continued to be exercised. Though all *dairies* and *milk sellers* are licensed adulteration is frequently practised, and it is stated that on the whole the conditions under which milk is supplied are still unsatisfactory.

The measures taken to spread knowledge of hygiene and sanitation remain as described in these pages a year ago. Health education films attract good audiences and the policy of Health Inspectors visiting and lecturing in kampongs is achieving success.

The training of Sanitary Personnel was continued at Singapore (see this *Bulletin* 1937 Supp. p 158\*). Three candidates were sent from Perak to take the course three appeared for re-examination and two were successful. In Selangor two probationary sanitary inspectors are under training prior to taking the course at Singapore.

The various legislative measures enacted during the year in the interest of public health dealt with such matters as Sanitary Boards Mental Diseases Quarantine Medical Registration and Deleterious Drugs.

*Port Health Work.*—Ocean-going vessels entering and clearing from Port Swettenham during 1938 numbered 2,063 and there were also 920 other vessels dealt with exclusive of native craft. The Port Health Officer examined 38,506 passengers and 12,439 members of crews. 30 immigrant vessels arrived from infected ports all immigrants on board being quarantined for a scheduled period. Eight pilgrim ships passed through the port but no pilgrims embarked or landed. The examination of immigrants for signs of leprosy was continued and among 8,482 persons examined 46 cases of leprosy were discovered and 39 patients repatriated. Immigrants are also examined for signs of recent vaccination and where such signs are absent are revaccinated. 1,973 vaccinations were performed under this regulation.

*Hospitals Dispensaries etc.*—An increase in the number of admissions to hospitals is recorded, viz. 98,551 as compared with 92,353 in the preceding year. the racial distribution of patients reads Chinese 33,621 with 4,072 deaths. Indians 52,731 with 2,870 deaths. Malays 9,807 with 219 deaths and Others 2,392 cases and 100 deaths. In-patients and out-patients treated at Hospitals, Dispensaries etc. in the four States were as follows —

State	Hospitals	Beds	Admissions	Deaths	Out patients
Perak	15	2,312	43,308	3,337	269,171
Selangor	7	1,475	23,846	1,917	219,129
N. Sembilan	6	966	15,780	1,194	105,795
Pahang	7	653	13,817	813	120,465
Totals	35	5,406	93,851	7,261	714,560

Of the total out-patients treated 232,111 were dealt with at *Stationary Dispensaries* and 203,247 by *Travelling Dispensaries* the number and distribution of these out-patient treatment centres being —

Item	Perak	Selangor	N. Sembilan	Pahang
Rural Dispensaries	19	12	4	8
Travelling Dispensaries (Motor)	8	4	5	4
Travelling Dispensaries (River Motor Boats)	2	—	—	1

The prevailing diseases amongst in-patients were *malaria respiratory affections venereal diseases* the notes which follow summarize the textual commentaries contained in the Report under review.

Though *malaria* figures remain high both incidence and mortality are lower than in the preceding year. Hospital admissions for this cause totalled 20,344 and of these diagnoses was confirmed by microscopic blood examinations in 15,317 cases, the findings being *subtertian* infections 64.6 per cent. *benign tertian* 28.7 *quartan* 2.3 and *mixed* infections 4.4 per cent. Deaths ascribed to *malaria* numbered 915 and to *undefined fevers* 12,456. hospital deaths due to *malaria* numbered 627. there were also 12 cases of *blackwater fever* with 3 deaths.

Among 290 920 blood films examined at hospital laboratories 28,970 were found to contain malaria parasites 17,271 being *sub-tertian* 9,858 *benign tertian* 804 *quarlan* and 837 *mixed infections*. There was an increase of malaria in the coast district of Selangor the infection being due to 4 *sundaichs*. It is reported that anti malaria measures in the rural areas are hindered by lack of funds and the continued absence of necessary legislation. Meanwhile the Chairman of the Malaria Advisory Board emphasizes the wastage of man power financial loss and misery caused to hundreds of thousands of people due to the disease (see this *Bulletin* 1937 Supp p 160\*)

At the Institute for Medical Research the Malaria Research Officer investigated and demonstrated the efficacy of atabrin as a prophylactic and examined the claims of malorein a drug widely advertised in the near East. Experiments in improving the composition of anti-larval oils were continued. No case of *cholera* has been reported since 1927 nor of *plague* since 1928. There were no cases of *smallpox* but routine vaccinations were continued 81 629 vaccinations being performed during the year.

Eleven cases of *cerebrospinal meningitis* with nine deaths were recorded 8 cases with 6 deaths in Selangor and 3 fatal cases in Perak. Cases of *tropical typhus* admitted to hospitals numbered 211 and 19 deaths were recorded. At the Institute for Medical Research after five years of investigation the Pathologist has proved that the two diseases rural typhus and Japanese River Fever are identical the discovery is of no little scientific interest and reduces the number of typhus-like fevers in Malaya from three to two. Nine cases of *acute poliomyelitis* with one death were reported from Selangor. Cases of *dysentery* dealt with in Government Hospitals numbered 140 with 42 deaths while total deaths due to this cause in the Federated Malay States numbered 48 with 161 notifications of cases of the disease (see this *Bulletin* 1937 Supp p 160\*). Of the total deaths recorded the State of Selangor again heads the list with 26. Hospital admissions of patients suffering from *influenza* numbered 5 729 and of these 18 died.

*Enteric fever* is said to occur mainly in the urban areas and so far as can be ascertained is directly connected with hawkers of food. Hospital cases dealt with numbered 328 and of these 309 were admitted during the year of the total cases 312 were *Bac* *typhosum* and 16 *Bac* *paratyphosum* infections. At the Institute for Medical Research work begun in 1932 on the enterica group was continued results of the investigation are expected to be available during 1937. Under the title of *dysentery* 1,347 cases were treated as in patients at Government Hospitals and 203 died. In the four Federated Malay States deaths due to *dysentery* and diarrhoea totalled 1 696. It is thought the incidence of the disease is related to recently arrived Indian immigrant labourers but a variety of factors are involved none being held solely responsible.

Both the incidence and mortality due to *beriberi* show increases over 1935 experience hospital admissions numbered 389 cases treated 661 and 66 of these patients died. In the Federated Malay States as a whole there were 339 *beriberi* deaths 124 of these occurring in the State of Selangor.

## STRAITS SETTLEMENTS (1936)

The Colony of the Straits Settlements the collective name given to the Crown Colonies formed by the British possessions on or adjacent to the mainland of the Malay Peninsula as opposed to the Federated and Unfederated Malay States, consist of the island of Singapore with about a score of small islets lying in its immediate vicinity the town and territory of Malacca, the island of Penang and Province Wellesley and the island of Labuan. The total area is about 1,357 square miles (Singapore 220 square miles Penang and Province Wellesley 400 square miles Malacca, 640 square miles) and Labuan, 35 square miles.

*Introductory*—The reader is referred to p. 461 *supra* where mention has been made that in 1936 the Annual Reports of the Federated Malay States and Straits Settlements appeared for the first time under one cover.

*Total Statistics*—The mid year population was estimated to be 1 168 197 the local and racial distributions being as follows—

Item	Singapore	Penang	Province Wellesley	Malacca	Labuan	Total
Europeans	10 452	1 747	334	422	29	12 934
Europeans	7 437	2 177	288	2 205	43	12 150
Malayans	69 972	40 781	73 902	104 261	8 130	294 046
Chinese	435 191	131 183	43 264	71 239	2 307	708 404
Indians	81 740	28 347	24 896	24 085	147	129 315
Others	8 371	1 750	543	616	61	11 345
Totals	603,163	205,994	148 405	202,828	7,807	1 168,197

*Registered live births* numbered 51 788 giving a crude birth rate of 44.3 per 1,000 the highest rate so far recorded in the Colony. The highest birth rate recorded was that for Chinese in Singapore. It is pointed out that among the Chinese population the proportion of women of child-bearing age has increased steadily since 1931. *Registered deaths* totalled 29 094 and the crude annual death rate 24.9 per 1,000 a slight improvement over the 1935 rate. *The Infant Mortality Rate* notwithstanding the increased attention devoted to infant welfare activities, rose to 170.9 per 1,000 live births the rate recorded after correction for children born elsewhere. In an attempt to account for the increased rate it is pointed out that during 1936 women were employed in industry to a greater extent than usual. Infant mortality continues to be highest among Malays in Singapore and Malacca.

*Maternity and Child Welfare Work*—During recent years Government has devoted special attention to the provision of maternity and infant welfare services. Maternity wards or beds are available at most of the hospitals (see this *Bulletin* 1937 Supp. p. 185\*) and during the year under review the details of work shown in Table on following page were recorded.

Regular courses of training continue to be provided (see this *Bulletin* 1937 Supp. p. 185\*). Registered midwives in the Colony numbered, Class A. 326 Class B. 851 and Class C. 341.

Centre	Admissions	Deliveries	Maternal Deaths
<i>Singapore</i>			
General Hospital	1 178	1 014	10
Maternity Hospital Pandang Kerbau	5 142	4 717	62
St. Andrew's Mission Hospital	?	431	?
Kwong Wai Shun Hospital	?	389	?
<i>Penang</i>			
King Edward VII Maternity Hospital	2 187	1,906	26
Butterworth Hospital	70	61	2
Bukit Mertajam Hospital	83	83	2
Sungei Bakap Hospital	76	59	4
<i>Malacca</i>			
General Hospital	713	596	16
Alor Gajah Hospital	66	47	3
Jasin Hospital	42	40	0

*Infant Welfare Centres* supervised by Health Officers are placed in charge of Health Sisters to whom are attached Health Nurses Health Visitors and trained Midwives (see this *Bulletin* 1937 Supp. pp 165\*-166\*) There are now 23 Government Infant Welfare Centres and 9 Sub-Centres attendances at clinics totalled 188 743 and visits to houses 213 152. At the three Singapore Municipal Clinics 17 418 new infants were placed on the registers attendances numbered 48 888 and 28 062 visits were paid to the homes of 18,304 mothers.

*The Women's and Children's Dispensaries* conducted by Government in the large towns continued to function with success. During the year 49 089 new patients were dealt with and among them 24 758 children.

*School Hygiene*—The arrangements providing for the inspection of schools and schoolchildren in Singapore Penang Province Wellesley and Malacca remain as previously described (see this *Bulletin* 1937 Supp. p 166\*) Below are given the principal facts recorded during the medical inspection of children but it is necessary to mention that in addition to these details routine inspections of schools and school premises were made on numerous occasions in all areas for purposes of general school hygiene by Medical Officers and Sanitary Inspectors in this connexion it may be noted that a number of private or aided Chinese and Tamil schools are at present subject to sanitary supervision health conditions in such schools are gradually being brought into accordance with the requirements of the *Registration of Schools Ordinance*. The following is a summary statement of the principal findings recorded during the course of medical examinations in various schools—

*Singapore*—Girls Schools visited 31 pupils examined 8,384 pupils referred for treatment 6 192 principal defects noted—defective vision etc. 68.3 per cent. dental caries 59.9 per cent. enlarged tonsils 11.3 per cent. Hookworm and round worm common in teachers and pupils of Malay Girls Schools. Boys Schools visited 46 pupils examined 10,928 principal defects noted—dental caries 30.8 per cent. defective vision etc. 5.0 per cent. skin diseases 6.1 per cent.

*Penang*—Pupils examined in English Girls Schools 1 481 of these 46.9 per cent. with gross dental defects 10 per cent. with defects of throat nose and ear English Boys Schools pupils examined 4 786 with gross dental defects 55 per cent. nose throat and ear defects

The incidence of *malaria* as judged by recorded figures declined considerably 9,502 cases being admitted to Government Hospitals and 9,749 cases were treated as compared with 13,432 admissions in the preceding year and there were 283 deaths due to this cause. Deaths due to malaria in the Straits Settlements as a whole numbered 1,315 but there were also 3,562 deaths ascribed to *unspecified fevers*. Types of infection among the 9,749 in patient cases dealt with included 4,410 *subtertian*, 2,702 *benign tertian* and 188 *quartan* while 210 were mixed infections and 1,770 were unclassified. Mention has been made in the section *Public Health* above of antimalaria work undertaken in the Colony. There was one non-fatal case of *blackwater fever*.

The *Third International Course in Malariology* in the Far East organized by the League of Nations was held at the King Edward VII College of Medicine Singapore in April, May and June practical field studies being arranged for in Indo-China, Java and Malaya. The course was attended by 18 graduates from nine countries.

*Plague* has not occurred in Malaya for many years. *Cholera* is now rare owing to the provision of good water supplies and the special measures taken at ports and frontiers to exclude the disease. There is little *smallpox* in Malaya, small outbreaks occur from time to time but they are easily controlled (see this *Bulletin* 1937 Supp. p. 168\*). All children born and all immigrants are vaccinated. During 1936 Government Health Department Officers performed 21,254 primary and 43,625 re-vaccinations. Of *tropical typhus* 33 cases and two deaths were reported and 5 cases of Japanese River Fever. [With regard to the latter the reader is referred to the researches of the Pathologist at the Institute for Medical Research Kuala Lumpur p. 465 *supra*.] There were 21 cases of *cerebrospinal meningitis* of which 19 proved fatal.

In the Hospital Returns it is seen that 38 patients were admitted suffering from *diphtheria* and 20 died, while 84 deaths were ascribed to this cause in the Colony as a whole. On the other hand cases notified in the City of Singapore alone numbered 176.

As regards *enteric fever* it is again pointed out that itinerant hawkers of foodstuffs are mainly responsible for the presence and spread of the disease. During the year 565 cases of *typhoid* and 14 of *paratyphoid fever* were dealt with as in-patients at Government Hospitals and 146 of these died. In the Colony as a whole 187 deaths were recorded and in Singapore alone 455 cases of the disease were notified. In-patients treated for *dysentery* at Government Hospitals totalled 865 and 197 deaths were recorded. The classification of cases reads 277 amoebic, 507 bacillary, 9 were mixed infections and 72 were undefined. In the Colony as a whole 314 deaths were ascribed to dysentery and there were in addition 1,417 deaths assigned to the title *diarrhoea and enteritis*.

*Tuberculosis* is said to be increasing slightly and that the great majority of the cases dealt with are of the *pulmonary* form of the disease. Deaths due to all forms of tuberculosis in the Colony numbered 2,362 of which 1,406 occurred in Singapore. Returns relating to Government Hospitals contain the following facts —

Cases of tuberculosis (all forms) dealt with	3,252, deaths 1,108
Admissions during the year	2,876
Cases of pulmonary tuberculosis alone	2,932, deaths 984
Cases of pulmonary tuberculosis admitted	2,602

The measures taken to combat the disease were detailed in these pages a year ago. Facilities for medical and surgical treatment are provided at the General Hospitals where special tuberculosis wards are available. The difficulty of persuading the poorer class of patient to seek treatment in early stages of the disease is again emphasized (see this *Bulletin* 1937 Supp p 169\*). In-patients at Government Hospitals treated for lobar pneumonia and broncho-pneumonia numbered 1 724 (1 611 admissions) and 974 died. The death rate from pneumonia amongst Asiatics who are vulnerable to the disease is characterized as alarming. There were 1 409 in-patients treated for bronchitis with 22 deaths.

**Leprosy**—The increase in the number of cases seeking admission to leper settlements is a matter of grave concern to the Government and steps are being taken to deal with the problem. At present compulsory segregation of lepers is imposed by law but as it is generally believed that drastic legislation has the effect of driving lepers into hiding it is proposed to amend existing laws. Examination of immigrants at ports of entry makes it clear that the majority of the cases of the disease are introduced from outside Malaya. The Chinese immigrants are mainly responsible for owing to the long incubation period infected persons may show no signs of the disease on arrival. Efforts are now being made to detect early signs of leprosy in Chinese and other immigrants (see also this *Bulletin* 1937 Supp p 169\*). Intensive treatment on modern lines was continued throughout the year at the Leper Settlements the Reports of these Institutions describe the year's work in great detail and from them the following facts have been extracted —

Item	Leper Settlements	
	Pulau Jerejak, Penang	Leper Settlement, Singapore
Admitted during 1936	421	237
Total treated	1 447	508
Discharged	22	10
Absconded	?	27
Died	190	13
Remaining at the end of 1936	1,217	224

Of the 1,217 patients at Pulau Jerejak 990 were Chinese 187 Indians and only 37 were Malays. At this Settlement during the year Camp E. providing 37 double huts with all necessary additions as regards sanitary conveniences water supplies etc. was practically completed while Camp F was occupied in October and 174 cases transferred there.

**Veneral Diseases**—There are V D Clinics for males in Singapore Penang and Malacca special sessions are held for women at the Women's and Children's Dispensaries in Singapore and Penang and in addition facilities for treatment are provided at all hospitals and outdoor dispensaries. New cases presenting themselves for treatment at Government Clinics totalled 22,680 and of these 11 652 were Chinese 6 794 Indians 2,873 Malays 576 Europeans and 785 were grouped under the title of "Others". At Government Hospitals the following in-patient cases were dealt with —



## REVIEWS AND NOTICES.

BECK (Conrad) [C.B.E.] *The Microscope Theory and Practice*—284 pp. With 217 figs 1938. London R. & J. Beck, Ltd., 69 Mortimer Street, W 1 [7s 6d] [Review appears also in *Bulletin of Hygiene*]

This is a book which all who use the microscope whether for research or recreation may read with profit. Mr Conrad Beck has long been recognized as one of our leading authorities on microscope design and microscopic optics and his wide knowledge and practical experience have enabled him to present in concise and lucid language an explanation of those technical problems which all who use the microscope must be prepared to face and overcome if they wish to obtain accurate results. As a matter of fact there exists a great need for such a book as this among both students and research workers for it is a deplorable fact that in most training centres for medical and biological students little time or attention is given to teaching the correct use of the microscope although every effort is made that the student should obtain a thorough knowledge of the technique of the fixation of tissues and their subsequent sectioning staining and mounting. But of what use is the most perfectly prepared specimen if the student or research worker has not a sound knowledge of the proper optical adjustments of his microscope by which alone he can hope to arrive at a correct interpretation of the object he is examining?

The technique employed in the correct use of the microscope is not entirely simple and to neglect the principles involved may easily produce the most misleading results. In writing this book Mr Conrad Beck has kept strictly before him the needs of the practical worker and has devoted the bulk of the space at his command to a straight forward explanation of the theory and use of the microscope, without any reference to those complicated mathematical details which are solely of interest to the computer of microscopic lenses. The practical worker will be well advised to concentrate his attention on chapters I, III, V and VI for these contain much valuable information, well illustrated, and free from all unnecessary technical jargon. The opening chapter is devoted to a simple description of the instrument and of certain characteristics of the mechanical and optical parts attention being drawn to the importance of the correct centration of illuminant mirror and substage condenser correct tube-length the aperture of the objective in relation to resolution and magnification and the effect of thickness of cover-glass when high-power dry objectives have to be used. Many points briefly surveyed in this chapter are dealt with more elaborately in subsequent pages of the book thus chapter III is devoted to a detailed explanation of aperture and resolution, while chapter V deals with illumination and its technique stressing the importance of avoidance of definition-destroying glare—an all too common fault—and passing on to the selection of substage condensers, their centring and proper adjustment and the correct use of high-power dark-ground illuminators. The sixth chapter devoted to microscopes of special design, contains a most interesting account of ultra violet illumination and the ultra violet microscope with which lenses made from fused quartz have to be employed. For many years it was realized that ultra violet light if it could be properly employed, would greatly increase the power of the microscope for revealing fine detail,

but although many experiments were tried out it was not until Mr J E Barnard F.R.S. worked out a completely new technique that ultimate success was obtained

The remaining chapters are equally important for reference and deal with the geometric optics of the microscope the photometry of the instrument the testing of microscope objectives and the use of polarized light as applied to the microscope. Many useful tables giving working distance of objectives numerical apertures magnifications with given objectives and eyepieces etc are included and there are a very large number of illustrations of microscopes and apparatus

*F Martin Duncan*

BECKMAN (Harry) [M.D. Professor of Pharmacology at Marquette University School of Medicine Milwaukee Wis.] *Treatment in General Practice*. 3rd Edition Revised and Entirely Reset—787 pp With 7 figs. & 1 chart 1938. Philadelphia & London W B Saunders Company [42s]

In this book a brief general description is followed by an exhaustive discussion of the relevant and appropriate therapeutic measures in respect of each of the principal diseases of man with few exceptions—exceptions however which are of some importance to tropical workers since they include Asiatic cholera trypanosomiasis leprosy plague and yellow fever

The various methods of treatment have been culled from the experience of physicians all over the world and the book contains a good bibliography which enables the reader to follow up to its source any measure of special interest or appeal. The author modestly states that he regards himself merely as an editor and that the true authors are the men and women whose names appear in the bibliography. Unfortunately this method by its generosity and very scope leads in parts to weakness by including all opinions lines of therapy are indicated which in certain cases rest upon very insecure foundations while in some parts methods are described which are no longer commonly used. On occasion the author's iconoclasm does break through his charity in a charming manner but one would have wished that with his wide experience he had permitted himself to have been more frequently and even more ruthlessly critical. However the author has assembled a vast amount of therapeutic data and has provided a useful and accessible source of knowledge and interest for all who are engaged in the treatment of disease.

*F Murgatroyd*

FESTSCHRIFT BERNHARD NOCHT ZUM 80 GEBURTSTAG (4 NOVEMBER 1937) VON SEINEN FREUNDEN UND SCHÜLERN—pp x + 704 Ill. 1937 Hamburg Kommissionsverlag Friederichsen de Gruyter & Co

Bernhard Nocht is to German what Patrick Manson was to British tropical medicine. He was born in 1857 at Landsbut in Silesia and educated in the Realgymnasium there. After graduating in medicine at Berlin in 1881 he joined the Army and later the Navy. In the latter service he gained his first practical experience of tropical diseases during voyages to the Mediterranean and the East. He

himself contracted malaria a disease from which he suffered for several years and which has remained one of his chief interests ever since. His scientific work began in 1887 when he was seconded to the Hygienisches Institut in Berlin, at that time under the direction of Robert Koch. The turning-point of his life came in 1892 during the cholera epidemic in Hamburg. He was sent to take charge of measures for its control in the port and so successful were his efforts that the Hamburg Senate offered him the newly created post of Port Medical Officer. He resigned his commission in the Navy in order to accept this appointment and it was then that his real life work began. Not only did he develop the health services of the port from very meagre beginnings to a high degree of efficiency but also in 1900 following the examples of Liverpool and London in the preceding year he established the now famous Institut für Schiffs- und Tropenkrankheiten and became its first Director. Its success exceeded all expectations, as the yearly increasing numbers of German and foreign students testified. On being entrusted in 1906 with the control of the whole medical service of Hamburg Nocht was obliged to hand over his port work to a successor but retained his directorship of the Tropical Institute to which 14 years later on returning from the public service he was able to devote his undivided attention for a further ten years. Even then his activities did not cease for at the age of 73 he went on a world tour to study leprosy in India, Malaya, Siam, Manila and Brazil. Among his numerous scientific writings perhaps the most important are those on malaria and on beriberi. Nocht's great services to tropical medicine received well-merited acknowledgment in 1925 on the occasion of the silver jubilee of the Institute he founded, and in 1927 his seventieth birthday was marked by the publication of a volume of works on tropical diseases to which 88 of his friends and pupils contributed. It must be no small comfort and gratification to him to know that he is still not forgotten in his retirement, a tangible proof of which is this second Festschrift in which 116 contributors from 30 different countries have joined to honour him on his eightieth birthday.

C. C. Barnard

CROZAFON (Charles) *L'arséno-résistance des trypanosomoses humaines.*

Arsenic Resistance of the Human Trypanosomes, Thesis for Doctorate of Medicine Univ. of Bordeaux—143 pp. (Bibliography 1936 Bordeaux. Imprimerie-Librairie Delmas 6 Place Saint-Christoly)

In this thesis the author gives an excellent summary of recent work on the important subject of arsenic-resistance. The article is divided into two sections the first dealing with the experimental investigations which have been conducted during the last 10 or 12 years on the nature and mechanism of the phenomenon and the second with clinical observations there is an extensive list of references. The work is well worth reading by those who are interested in the subject and have not themselves had the opportunity of reading the voluminous literature from which it is compiled.

H. York

# TROPICAL DISEASES BULLETIN

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[No 7

## BLACKWATER FEVER

CALCUTTA ANNUAL REPORT OF THE ALL INDIA INSTITUTE OF  
HYGIENE AND PUBLIC HEALTH 1936 [STEWART (A. D.) Director]  
—[Blackwater Fever pp 31-34] [KRISHNAN (K. V.)]

An epidemiological survey of blackwater fever has been conducted in 50 of the 155 tea-gardens situated in the Jalpaiguri Duars. About 98 per cent of the population consist of Paharias and Madecias the remainder are Chinese, Bengalees and Europeans. Between 1930 and 1936 a total of 132 cases of blackwater fever occurred in these 50 gardens. The distribution in the different groups of population of the 31 cases occurring in 1931 is shown in the following table —

Group	Population	Cases of Blackwater Fever
Europeans	112	1
Bengalees	811	25
Chinese	49	2
Paharias	10,404	2
Madecias	43,940	1

The case mortality was about 20 per cent. all the deaths occurring among the Bengalees. Over 70 per cent of the cases were adults about 20 years of age and 15 per cent were children below 10 years the youngest patient was 2½ years old. About 80 per cent of the cases occurred among those who had lived for over 3 years in the locality and 80 per cent of the cases occurred between May and September.

It is recorded that 8 of the 50 gardens were free from blackwater fever and had produced no case of the disease within the past six years. Neither the nature of the population nor the intensity or type of malaria in these gardens differed in any way from that of neighbouring gardens noted for blackwater fever. The explanation of this interesting phenomenon is being sought.

A brief account is given of biological studies of the blood in cases of blackwater fever and in malarial haemoglobinuria of monkeys. The total cholesterol figures were lower than the normal values, while the figures obtained for organic phosphorus were on the whole higher

than the normal. These changes indicate that there is not only a derangement of the fat metabolism but also prior to haemolysis there is an upset in the lecithin-free-cholesterol ratio.

The nature of biochemical changes observed in monkeys, prior to the onset of haemoglobinuria suggested that these changes may be the result of a profound injury to the liver. Histological examinations of the liver and adrenals confirm this hypothesis and suggest the lines of treatment which may be profitably adopted.

Attempts were made to treat haemoglobinuric monkeys by correcting the observed biochemical and pathological changes or by preventing their occurrence. Treatments on the following lines were tried —

" (1) Intravenous injections of glucose and insulin to correct if possible the deranged carbohydrate metabolism. (2) Injections of a colloidal solution of cholesterol to increase the free cholesterol content and prevent haemolysis. (3) Injection of compounds like glutathione which are known to bring about oxidation of fatty acids both *in vivo* and *in vitro*. (4) Injections of choline hydrochloride and choline phosphoric ester (synthesised in our laboratory). This line of treatment was suggested by the fact that choline is present in the spleen and that splenectomised monkeys show a greater incidence of haemoglobinuria. It is possible therefore that deficiency in choline in splenectomised animals plays a part in the causation of haemoglobinuria. (5) Injection of cortin and ascorbic acid to make up for the degenerative changes observed in the adrenal cortex.

The author states that they have obtained encouraging results with a combination of glucose, ascorbic acid and cortin, and that of these cortin appears to be the most important. W. York

BHATTACHARJEE (Jagdish C.) Black Water Fever.—*Med. Bull. Bombay* 1938. Apr. 2. Vol. 6. No. 7. pp. 222-228.

A semi-popular description of the disease containing nothing new

IV 1

VOIGT (E. M.) & VOIGT (C.) Haemoglobinaemia in Malaria.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. Mar. 17. Vol. 31. No. 5. pp. 539-548.

BARRATT and YORKE (1906) attempted quantitative estimation of plasma haemoglobin upon finger blood from 14 cases of malaria, 17 cases of blackwater fever and some controls, without finding significant increase in malaria.

Many years later YORKE, MURGATROYD and OWEN (1930) and FAIRLEY and BROMFIELD (1933) improved the technique for quantitative estimation. The latter authors, in their conclusions stated that malaria is unaccompanied by haemoglobinaemia but foresaw that it might be found in cases of primary hyper-infection producing severe anaemia and intense jaundice such as one occasionally encounters in the tropics.

The present authors in the course of work upon the aetiology of blackwater fever have examined a number of cases of malignant tertian malaria with respect to the haemoglobin content of the "true" plasma. An account is given of the technique employed, and it is

concluded that the apparatus used is sensitive to amounts of oxyhaemoglobin at least as small as 5 mgm. per 100 cc. of solution and to amounts of methaemoglobin at least as small as 100 mgm per 100 cc of solution

The authors have examined in this way the true plasma from 17 cases of malignant tertian malaria and from 25 cases other than malaria. Each of the control cases was checked by the absence of parasites in the blood. None of them had methaemoglobinaemia and in only 9 was oxyhaemoglobinaemia detected in amounts varying between 5 and 19 mgm per 100 cc of plasma.

All the malaria cases exhibited *P falciparum* in thick or thin blood films. A few of the cases were primary infections some were relapses but the majority were re infections. Nine showed no haemoglobin in the plasma 4 showed traces (5 to 15 mgm per 100 cc) and the remaining 4 showed as highest figures 60 42 5 35 and 22 5 mgm. per 100 cc respectively. In no case was methaemoglobinaemia observed. Two of the last 4 cases had a normal or a subnormal temperature when the oxyhaemoglobinaemia was detected.

In view of the fact that concentrations such as these have not hitherto been recorded in malaria the authors give further details regarding the patients. These which are mainly of a biochemical nature are set out in tabular form

W Y

CASTLE (W B) & DALAND (Geneva A) Susceptibility of Mammalian Erythrocytes to Hemolysis with Hypotonic Solutions. A Function of Differences between Discoidal Volume and Volume of a Sphere of Equal Surface.—*Arch Intern Med* 1937 Dec. Vol 60 No 6 pp 949-966 With 5 charts. [22 refs]

This paper which is of a technical nature must be read in the original by those interested. The following are the conclusions —

Our results suggest that differences in the susceptibility of various types of erythrocytes to hemolysis with hypotonic solution of sodium chloride are due largely to differences in form and not to differences in osmotic behavior.

The percentage increases in equilibrium volumes in hypotonic plasma of erythrocytes of widely different susceptibilities to hemolysis do not show significant differences.

Direct microscopic observations indicate that (a) hemolysis of a given type of erythrocyte is associated with the assumption of a spherical form in hypotonic plasma and that (b) the more susceptible the erythrocyte to hypotonic hemolysis the less hypotonic the plasma necessary to cause the assumption of a spherical form.

An approximation to the percentage increase in volume necessary to cause hemolysis can be made by calculation of the percentage difference between the volume of the erythrocyte in isotonic plasma ( $V_0$ ) and that of a sphere of equal surface ( $V_s$ ).

In correlations of the relative degree of susceptibility to hypotonic hemolysis of a series of types of erythrocytes with their respective volume diameter or surface in isotonic plasma, the erythrocytes of hypochromic anemia and of chronic hemolytic jaundice present exceptions.

When these correlations are made on the basis of the diameter thickness ratio or when absolute values are calculated according to the formula  $\frac{V - V_0}{V_0}$  the erythrocytes of hypochromic anemia and of chronic hemolytic jaundice do not present these exceptions.

"Differences in the time necessary to cause hypotonic hemolysis of different types of erythrocytes may possibly be explained by difference

in the percentage increase in volume of the discoidal form necessary to produce the spherical form in hypotonic solution."

W 3

HAM (Thomas H) Chronic Hemolytic Anemia with Paroxysmal Nocturnal Hemoglobinuria. Study of the Mechanism of Hemolysis in Relation to Acid-Base Equilibrium.—*New England J of Med* 1937 Dec 2 Vol 217 No 23 pp 915-917 [10 refs]

This paper gives the preliminary results of the study of the mechanism of haemolysis in 3 patients exhibiting the clinical syndrome of a chronic haemolytic anaemia associated with paroxysmal nocturnal haemoglobinuria (Marchiafava's disease). For details the paper must be consulted in the original.

The following summary is given —

"It is apparent that the red blood cells of these patients, both in vitro and in vivo are abnormally susceptible to hemolysis in plasma of increased acidity within the physiologic range of pH variation. A thermolabile factor essential for this hemolysis was found in the patients' plasmas and serums and in the plasmas and serums of normal subjects. This hemolytic system differs from that of paroxysmal hemoglobinuria from cold (Donath-Landsteiner reaction) in the following respects: (1) hemolysis occurred without previous chilling; (2) the essential abnormality resided in the red blood cells; (3) the plasmas showed no apparent abnormality or hemolytic action on normal cells; (4) the plasmas of normal subjects exhibited the same behavior as the plasmas from the patients; (5) since the addition of complement did not re-activate the heated serums, the hemolysis described above did not depend upon an antigen-antibody-complement system. Because the red blood cells of these patients showed a normal resistance to hemolysis by hypotonic salt solutions, the abnormality characteristic of congenital hemolytic jaundice was not present.

The oral administration of acid forming salts clearly increased intravascular hemolysis. Although the oral administration of alkaline salts decreased intravascular hemolysis, withdrawal of alkali produced such striking and prolonged elevations of hemoglobinemia and hemoglobinuria that it is considered inadvisable as a therapeutic measure.

"In one patient, previous splenectomy apparently had not altered the fundamental abnormality of the red blood cells or significantly decreased the anemia, but had eliminated the increased hemoglobinuria during sleep. It is probable that the slight decrease in the pH of the peripheral blood during sleep may not entirely reflect the acidity of certain regions of the body which results from the relatively inactive circulation at such times. Destruction of red blood cells is thought to occur within the splenic pulp, where anatomic and physiologic observations have demonstrated an ample opportunity for circulatory stasis to occur. Therefore it appears likely that splenectomy in one patient had removed an organ which in the other two patients may provide a region with sluggish circulation and consequently with a pH materially lower during sleep than that of the general circulation.

W 3

DACEY (J V) ISRAELI (M C G) & WILKINSON (J F) Paroxysmal Nocturnal Haemoglobinuria of the Marchiafava Type.—*Lancet* 1938 Feb 26 pp 479-482 With 1 chart [41 refs]

This is an interesting paper dealing with the mechanism of production of haemoglobinuria in the condition known as paroxysmal nocturnal haemoglobinuria of the Marchiafava type. The chief characters of this condition are an anaemia of a chronic haemolytic

type associated with jaundice and persistent haemoglobinaemia. The haemoglobinuria is most severe at night. The anaemia varies according to the severity of the haemoglobinuria.

Hamburger and Bernstein in 1936 reviewed the clinical features in detail quoting 22 recorded cases and two of their own. Wits (1936) also described a case and gave references of 12 others. Splenectomy and other forms of treatment appeared to have little permanent value.

The authors describe in considerable detail the case history of a patient who came under their own care. They also give an account of the serological investigations made on this case. These investigations which are of considerable interest must be consulted in the original.

The following is the summary. —

In a case of paroxysmal nocturnal haemoglobinuria of the Marchiafava type autohaemolysis has been demonstrated in vitro and shown to be dependent upon the pH of the system. The optimum pH for lysis is approximately 7.0-7.2, and it could not be produced at a pH greater than 7.8.

Autohaemolysis of whole blood will occur at 37°C without preliminary chilling.

It is suggested that the patient's red cells are sensitive to a potential lysin present in normal sera. The interaction between the patient's red cells and this lysin is probably responsible for the clinical picture of severe haemolytic anaemia with nocturnal haemoglobinuria.

IV Y

BATSCHWAROFF (W.) Hämoglobinurie bei Icterus haemolyticus. [Haemoglobinuria in Haemolytic Icterus.]—*Deut Med Woch* 1938. Feb 4 Vol 64 No 6 pp 191-192. [12 refs.]

Details are given of a case of haemolytic icterus associated with haemoglobinuria. This is an extremely rare occurrence. The haemoglobinuria was observed during a severe haemolytic crisis for which no definite cause was discovered. Blackwater fever and drugs could be excluded. The author considers that the occurrence of haemoglobinuria must be ascribed to a combined effect of a peculiar constitution and other at present unknown factors.

IV Y

LANDOR (J. V.) Blackwater Fever or Lederer's Anaemia?—*Jl Malaya Branch Brit Med Assoc* 1937 Dec. Vol 1 No 3 pp 184-187

The author believes that certain cases diagnosed as blackwater fever may be the acute haemolytic anaemia of Lederer and that in these cases the use of blood transfusion as treatment is likely to be successful.

Details are given of a case of febrile haemoglobinuria in a Chinese boy aged 6 years. Rapid improvement followed blood transfusion. Landor appears to be of the opinion that the case might equally well be blackwater fever or Lederer's anaemia.

IV Y

BLACKIE (W. H.) Blood Transfusion in the Treatment of Blackwater Fever—*Lancet* 1937 Nov 13 pp 1124-1126

The author very rightly begins his paper by stating a truth which although axiomatic, has been frequently disregarded by those who from time to time advocated various modes of treatment for blackwater fever. He writes: "In assessing the value of any line of therapy in blackwater fever due attention must be paid to the average mortality rate from the disease in any given area."



As the disease has been the subject of considerable investigation in Southern Rhodesia, a certain number of statistics are available. THOMPSON (1924) records an average death-rate of 23.53 per cent. in a series of 1 058 cases, and ROSS (1932) records a death-rate of 22.20 per cent amongst 679 cases. Examination of the figures quoted by Thompson and by Ross shows that significant fluctuations in the death rate occurred from year to year—this fact still further complicates the statistical evaluation of any method of therapy.

Blackie states that the present paper does not claim to be a statistical study of the value of blood transfusion in the treatment of blackwater fever but constitutes a simple clinical study (extending over a period of 5 years) of the application of blood transfusion to the therapeutics of the disease. In all, blood transfusion was performed in approximately 50 cases of blackwater fever but in only 22 cases was the treatment controlled personally throughout the whole of the illness. Fifteen of these 22 cases were treated in hospital, and the remainder in the patient's home in a country district. Thirteen of the 15 hospital patients recovered and 6 of the 7 country cases. Three deaths occurred in the patients suffering from anuria.

The conclusions are as follows—

Blood transfusion has been systematically employed in the treatment of blackwater fever in Southern Rhodesia over a period of five years. Even after due allowance has been made for the fluctuations in the fatality rate from year to year it is felt that blood transfusion is an important life-saving measure in this disease.

"It is important to realise, however, that if full value is to be derived from this line of therapy it must be instituted in the early stages of the disease and not delayed until the patient is moribund. During the haemolytic phase the body may be in considerable need of an emergency supply of red cells and, since there is evidence to show that the erythroblastic activity of the marrow is in abeyance at this time, the necessity for early transfusion is apparent.

"Secondly the transfusions must be repeated until there is haematological evidence of active erythropoiesis. While there is no evidence to show that blood transfusion shortens the haemolytic phase of the disease there is equally no indication that it serves in any way to aggravate or prolong the haemolysis. On the other hand, the demonstrable benefits accruing from blood transfusion are such that the immediate effect on the active phase of the disease need not be regarded as a major consideration.

"Finally while blood transfusion is not indicated in every case of blackwater fever it is predominantly useful in the toxic polyuric and in the relapsing type of case and in post-blackwater anæmia, whereas it is definitely contra-indicated in toxic anuric blackwater.

II 1

WAYS (R. C.) & HARBESGIAN (S. A. S.) A Note on the Prevention of Haemoglobinuria in *P. knowlesi* Infections in *S. rhesus* by Methylene Blue and its Curative Value when Combined with Quinine Salts.—*Records of the Malaria Survey of India* 1937 June-Sept. Vol. 7 Nos 2 & 3 pp 179-183.

Experiments are recorded indicating that the use of methylene blue prevented the occurrence of haemoglobinuria in *rhesus* monkeys infected with *P. knowlesi* and that when this substance was administered as a therapeutic agent together with quinine the result was better than that obtained with quinine alone.

*P. knowlesi* infections of *rhesus* monkeys are eminently suitable for testing the effects and utility of antimalarial drugs because this parasite almost invariably causes the death of the animal and often produces haemoglobinuria in the terminal stages of the infection. MULLIGAN and SINTON (1933) state that 'out of 120 infections it has been found that death resulted in every case when treatment of the initial attack was withheld. More recent unpublished data from the Malaria Survey of India Kasauli show that of 254 *S. rhesus* infected with *P. knowlesi* and untreated only 4 escaped death and in the majority haemoglobinuria occurred. If treatment was not commenced early death resulted in spite of treatment recovery rarely occurs when treatment is delayed until the third and fourth day of the attack.

In the first experiment which was performed in August 1934 two monkeys were inoculated with *P. knowlesi*. In each case parasites appeared on the 7th day and 3 days later when about 70 per cent of the red cells were affected treatment was commenced. The control monkey was given 2 grains of quinine on each of two consecutive days and died with haemoglobinuria some hours after the second dose. The other monkey received the same doses of quinine but in addition 5 cc of a 1 per cent solution of methylene blue intravenously on each occasion when the quinine was given. There was no haemoglobinuria and it is stated that the monkey recovered and remained free from malaria for 4 months.

The second experiment which was conducted in January 1937 was of a similar nature. The control animal, treated by quinine alone developed transient haemoglobinuria and died with scanty parasites in its blood. The second animal, which received methylene blue in addition to the quinine did not develop haemoglobinuria, and parasites disappeared from its blood. It died a fortnight later from dysentery.

Details are also given of another experiment performed at the end of 1934. In this experiment one monkey which was treated with methylene blue alone died of the infection the other monkey which was given both methylene blue and quinine recovered from the infection. It relapsed after a fortnight but the treatment was repeated, and there was no further relapse during the observation period of three months. The following summary is given —

A small series of *rhesus* monkeys infected with *P. knowlesi* was treated with quinine sulphate alone with methylene blue alone and with a combination of these two drugs. The following inferences seem to be justified from these experiments —

1. When the infection is at its height, quinine administered alone may expedite the onset of haemoglobinuria which may or may not be present in untreated cases.

2. The administration of methylene blue alone prevents the development of haemoglobinuria in monkeys but has no effect on plasmodia. When the latter drug is given simultaneously with quinine sulphate it cures *P. knowlesi* infection in *S. rhesus* this combination of drugs being more potent than quinine alone.

## YELLOW FEVER.

JAMES (S P) Renseignements sur la fièvre jaune reçus au cours des  
neuf mois finissant le 30 septembre 1937 (Information on Yellow  
Fever received during the Nine Months ending Sept. 30th, 1937)  
—Bull Office Internat d'Hyg Publique 1938 Jan. Vol. 30  
No 1 pp 45-53

The number of cases of yellow fever during the nine months ending  
30th September 1937 are shown in the following table —

Country	State	South America		
		No of localities with cases	No of cases	No. of deaths
Brazil	Matto Grosso	7	32	15
	São Paulo	22	74	74
	Paraná	1	2	2
	Minas Geraes	24	62	62
	Territ d Acre	1	2	2
	Piauí	3	7	7
Colombia	Piauí	1	1	1
	Meta	5	4	4
	Santander	4	8	8
	Boyacá	2	13	9
Paraguay	Cundinamarca		4	4
	Forests of N W	1	Present	
Pera	River Perené	1	33	15
Africa				
French W Africa	Dahomey	1	2	2
	Ivory Coast	4	8	5
	Senegal	9	15	14
French Equat Africa	Gabon	2	3	2
	Middle Congo	1	1	1
	Oubangui-Chari	1	1	1
British W Africa	Gold Coast	23	61	52
	Nigeria	9	18	9

It will be noticed that during this period there is an increase over the number of cases recorded last year. In the Gold Coast 14 cases, all fatal, occurred at Accra. 13 being Africans and one a Syrian. A special feature of this epidemic was the low *Aedes* index, an examination of 7 700 houses giving only 74 breeding places. A further examination showed that these insects were breeding freely in abandoned wells hidden by vegetation and detritus.

In Nigeria an epidemic in a missionary centre affecting the Europeans, was preceded by a rise in the death-rate among the local African population without yellow fever being suspected.

The author gives useful summaries of recent work on the epidemiology and the application of the mouse protection test. It is confirmed that in certain parts to the south-east of Kordofan 70-80 per cent of the inhabitants show yellow fever immune bodies in their blood also a British medical officer and his Sudanese assistant who visited Kau during 1936 gave positive reactions although the blood examined before their visit had been negative. During this visit the British doctor was confined to bed with a fever for four to five days.

Dr FINDLAY has reported the vaccination of almost 600 persons by the use of attenuated tissue culture virus without immune serum. In no case was there any severe reaction. Dr BAUER forwards details of the history and preparation of this tissue culture virus which has been used for the vaccination of more than 5 000 persons in Brazil and about 1 000 in Colombia. With regard to the Brazil vaccinations Dr SOPER reports that a small proportion perhaps 5 per cent and certainly not more than 8 per cent of these 5 000 cases have had a slight head-ache and sometimes a febrile reaction on the sixth or seventh day. It was very rare for any of these cases to be confined to the house and in no case was the patient unwell for more than two days. The possibility of jaundice occurring as a late sequela of vaccination has been discussed previously. See this *Bulletin* 1938 Vol. 35 p 119.] E Hindle

ANDRIEU (G R J J) & MAUVAIS (F E R) Les acquisitions récentes concernant l'épidémiologie de la fièvre jaune [Recent Advances concerning the Epidemiology of Yellow Fever]—*Rev. Service Santé Milit.* 1938. Feb. Vol. 108 No. 2. pp. 179-204.

A general review of the subject

[It is questionable whether any modern authorities will agree with the opening sentence of this article to the effect that America is without doubt the original home of yellow fever the available evidence being overwhelmingly in favour of its African origin.] E H

HANSON (Henry) La fiebre amarilla en el Perené (Dpto. Junín, Perú) [Yellow Fever in Perené, Junín Department, Peru.]—*Bol. Oficina Sanitaria Panamericana* 1937 Nov. Vol. 16 No. 11 pp. 1041-1047. English summary.

From July 1921 until April 1937 no case of yellow fever had been recognized in Peru but on April 14th 1937 a serious outbreak of fever with high mortality was reported from Perené Department of Junín. The author visited the district and in one week saw 71 patients 10 of whom showed malaria parasites. However in addition clinical cases of yellow fever were seen at two plantations and on a subsequent visit two other cases. The disease is apparently the jungle type and the improved roads and increased travel suggest that the coast of Peru is in danger of reinfection. Automobiles and trucks leave this area every other day for Lima and the coast and can reach their destination within 24 hours of leaving the infected zone. On the other hand *Aedes* is absent from the infected area the disease being transmitted by other species of jungle mosquitoes. E H

- CAZAKOV (F.) Etude sur un cas de fièvre jaune observé à Brazzaville.  
[The Study of a Case of Yellow Fever observed at Brazzaville.]—  
*Ann. de Méd. et de Pharm.* Colon 1937 July-Aug.-Sept.  
Vol. 35 No. 3 pp. 625-648 With 5 charts.

A detailed account of a fatal case of yellow fever with typical symptoms occurring in a postal official at Brazzaville. The infection was traced to a colporteur arriving from the coast, and the low *Aedes* index in Brazzaville is considered to be the explanation of its remaining an isolated case. E H

- OMERICH (Emil) Gelbfieber-epidemie in Chile im Jahre 1912 [The Yellow Fever Epidemic in Chile during 1912.]—*Arch. f. Schiffh. u. Trop. Hyg.* 1933. Apr. Vol. 42 No. 4 pp. 174-178.

An historical account of an outbreak of yellow fever at Topocilla, a nitrate port in northern Chile. The infection was introduced by a marine engineer who was probably infected in Guayaquil, Ecuador and in spite of all warnings was placed among other patients in the hospital where mosquito nets were little used. In a short time there were more than 100 yellow fever cases with a mortality of above 30 per cent. By the application of anti-mosquito measures the epidemic was brought under control. E H

- PESTANA (Bruno Rangel) Considerações epidemiológicas a respeito da febre amarela e da febre amarela silvestre. [Discussion of the Epidemiology of Urban and Rural Yellow Fever.]—*Ann. Paulist. Med. e Cirurg.* 1937 Nov. Vol. 34 No. 5. pp. 441-485.

The author presents the main features of the ordinary urban yellow fever and of the jungle type, quoting largely from the literature and concludes that in São Paulo the disease is now of the latter rural type. H H S

- ARAÚJO (Henrique de Beaurepaire) Epidemiologia e prophylaxia da febre amarela. [Epidemiology and Prophylaxis of Yellow Fever.]—1937 30 pp. With 2 plates. Instituto Oswaldo Cruz, Rio de Janeiro.

- HOFFMANN (W. H.) La endemichidade da febre amarela, no continente africano.—Reprinted from *Rev. "Africa Méd."* Lisbon. 1935 Vol. 1 No. 9 pp. 65-84.

- JONES (Ricardo) La fièvre jaune sévérique au Brésil. [Jungle Yellow Fever in Brazil.]—*Bull. Office Internat. d'Hyg. Publique* 1933. Jan. Vol. 30 No. 1 pp. 54-68. [Refs. in footnotes.]

A useful summary of information on the epidemiology of yellow fever in Brazil which should be read in its entirety. The author distinguishes three varieties of the disease referred to respectively as urban, rural, and jungle yellow fever. The first two are stated to be transmitted exclusively by the agency of *Aedes aegypti* and man is the reservoir. In the case of jungle yellow fever however wild animals constitute the reservoir and the infection is transmitted by other kinds of mosquitoes. The most remarkable feature of jungle yellow fever epidemics is their extreme diffusion, and the fact that as a

general rule the disease avoids inhabited regions and occurs along mountainous routes. Most of the cases occur in February, March and April, following the three hot months of November to January. A similar distribution of cases occurred in the last epidemic of yellow fever in Rio de Janeiro. The jungle variety has a lower mortality than the urban form and its clinical features are often difficult to recognize. E H

RAGÃO (Henrique de Beurepaire) Relatório sobre o problema da febre amarela sylvestre em S. Paulo [Jungle Yellow Fever in S. Paulo]—1937 18 pp Instituto Oswaldo Cruz Rio de Janeiro

HITMAN (Loring) & ANTUNES (P. C. A.) Studies on *Aedes aegypti* infected in the Larval Stage with the Virus of Yellow Fever—*Proc Soc Experim Biol & Med* 1938 Jan Vol 37 No 4 pp 664-666

Larvae of *Aedes aegypti* were infected with yellow fever virus by placing them when half-grown in a suspension of blood serum from a rhesus monkey at the height of infection mixed with an equal quantity physiological saline solution. Pupation started 48 hours later and the pupae were washed and placed in tubes of clean water. The first 3 males that emerged were ground up and inoculated into a monkey which died of yellow fever after six days. Fifteen females fed on a monkey when four days old failed to produce infection but ten days later 29 females from the same lot produced yellow fever by bite another monkey.

In another experiment the larvae were immersed in a suspension virus for 24 hours then well washed and allowed to pupate in clean water with similar results. The amount of virus in the males which emerged was found to increase from 284 units on the first day to 2,500 units after seven days, and 127,500 after fourteen days. In addition four day-old females produced infection by bite.

Using the same technique mosquitoes were infected with a mouse neurotropic strain of the French virus in its 530 to 540th passage in mice.

Larvae were also infected by placing the eggs in the virus suspension and removing the young larvae a few hours after they had hatched into fresh water. Three experiments in which the titre of virus was low were negative but one lot immersed in a suspension containing 33 000 000 I.L.D. for mice per cc. was found to have retained the virus when the adults emerged seven to eight days later.

Attempts to transmit the virus through the eggs gave uniformly negative results. E H

HITMAN (Loring) & ANTUNES (P. C. A.) The Transmission of Two Strains of Jungle Yellow Fever Virus by *Aedes aegypti*—*Amer J Trop Med* 1938. Mar Vol 18 No 2. pp 135-147 [11 refs]

A demonstration of the transmissibility of two strains of jungle yellow fever virus by *Aedes aegypti* which is of interest since in view of the widespread endemicity of jungle yellow fever it is surprising how rarely the virus seems to have been introduced into towns harbouring this mosquito.

*Rhesus* monkeys were infected with two strains of jungle virus, the M.A.J. strain, first isolated in May 1935 in Taquaral, Goyaz, Brazil, and the Suarez strain isolated in June 1936 in Muza, Colombia. Mosquitoes were fed on infected monkeys and after varying incubation periods on normal animals. No difficulty was encountered in maintaining mosquito-monkey, mosquito passages, which have been carried through 17 passages in the case of the M.A.J. strain and 4 in the Suarez. The minimal incubation period, however, is about 14 to 15 days which is much longer than for the Asibi strain of urban origin.

It is possible that this longer incubation period may play a part in limiting the importation of jungle virus into towns since a greater percentage of infected insects would die before becoming infectious.

Of 27 monkeys infected with the M.A.J. strain 13 out of 17 survivors either had no fever or first showed fever after the virus had practically disappeared from the blood stream. In the other 4 survivors and the 10 which succumbed, the onset of fever corresponded with the period of maximum circulating virus. It is possible that this delayed febrile response in non-fatal cases may not be a characteristic of jungle virus as such but related to the pathogenicity for *rhesus* monkeys of the particular strain of virus.

If the human response is of this nature many cases brought to town for treatment would no longer be infectious for the local *Aedes aegypti* and this would reduce the frequency with which the jungle virus might invade urban centres.

E. H.

WHITMAN (Loring) & ALMEIDA (P. C. A.) Studies on the Capacity of Various Brazilian Mosquitoes, representing the Genera *Psorophora*, *Aedes*, *Mansonia*, and *Culex*, to transmit Yellow Fever.—*Am. J. Trop. Med.* 1937 Nov Vol 17 No 6 pp. 803-823 18 refs.]

A record of transmission experiments with various Brazilian mosquitoes in most cases using the virulent Asibi strain of yellow fever but in a few instances a Brazilian jungle strain (M.A.J.). The authors also include the results of experiments completed by Nelson C. Davis before his death in 1933.

The results confirm previous observations that *Aedes scapularis* and *A. furcator* are efficient vectors of yellow fever. *Aedes nubilus*, *A. terreus*, *Mansonia juxtamansonia*, *M. fasciolata*, *M. chrysomelum* and *M. albicosta* failed to transmit the infection by bite but the virus is retained in their bodies over long periods as determined by inoculating their contents into susceptible animals.

The authors were unable to repeat Davis's transmission by the bite of *Aedes taeniorhynchus* and although the virus persists for long periods in the body of this mosquito they incline to the view that it is not a vector.

The results with *Psorophora ferox* were confusing for although Davis was able to transmit yellow fever by the bite of this mosquito the authors were unable to confirm these observations but suggest the possibility of there being different races of this species varying in their capacity to transmit the disease.

Experiments carried out by Davis with *Aedes triseriatus* and *Culex nigripalpus* indicate that these species are unable to transmit yellow fever by bite and also are obviously inefficient vectors since in most instances injection experiments were also negative.

E. H.

ANTUNES (P C A.) & WHITMAN (Loring) Studies on the Capacity of Mosquitoes of the Genus *Haemagogus* to transmit Yellow Fever — *Amer J Trop Med* 1937 Nov Vol 17 No 6 pp 825-831 [10 refs.]

The efficiency of forest mosquitoes belonging to the genus *Haemagogus* as carriers of yellow fever is now of especial importance in view of the possibility of their being concerned in the spread of the jungle variety of the disease.

Experiments were made with two species but owing to the short life of these mosquitoes in captivity the interval between the infected meal and testing their infectivity was not extended beyond 16 days and it is well known that in some species (e.g. *Culex thalassius*) a much longer interval may be required.

*Haemagogus janthinomys* was found to retain the Asibi strain of virus in its body for at least two weeks but only one out of six feeding experiments gave a positive result. N C DAVIS also found that the virus persisted for at least 19 days in this species but his mosquitoes refused to feed after incubation periods of 16 to 19 days. One specimen of *H. urartus* retained the M.A.J. strain of jungle fever virus in its body for 16 days but did not produce infection when fed on a susceptible monkey on the 16th day. E H

VAN DEN BERGHE (Louis) L'immunité amarile de sérums prélevés chez des ictériques en Ubangi (Congo Belge) [Yellow Fever Immunity in Serum collected from Cases of Jaundice in Ubangi (Belgian Congo)]—*Ann Soc Belge de Méd Trop* 1937 Dec. 31 Vol. 17 No 4 pp 577-579

The examination of sera from 36 cases convalescent from jaundice in Ubangi by means of the mouse protection test gave 12 positives, 8 uncertain and 16 negative for yellow fever immune bodies but of 73 control sera from persons living in the same villages but not having a history of jaundice 19 were positive, 12 uncertain and 42 negative.

The results are difficult to interpret but the author considers that one can reasonably state that the sum total of positive tests as well as the clinical evidence excludes the possibility of these cases of jaundice having a yellow fever origin. E H

VAN DEN BERGHE (Louis) Sur l'existence d'une immunisation amarile récente chez des enfants du Bas-Congo [The Existence of Recent Immunization against Yellow Fever among Children of the Lower Congo]—*Ann Soc Belge de Méd Trop* 1937 Dec. 31 Vol 17 No 4 pp 581-582.

The examination of 51 sera collected from children at Matadi gave 3 positives, one from a 14 year old child. Sixty three sera from children at Banana, Boma and the neighbourhood gave 11 positives [ages not stated]. E H

BABLET (Jean) & BLOCH (Françoise) Sur le diagnostic différentiel de la fièvre jaune et la recherche d'un critérium histologique de cette affection. [The Differential Diagnosis of Yellow Fever and the Search for a Histological Criterion of this Affection.]—*Ann Inst Pasteur* 1937 Nov Vol. 59 No 5 pp 492-516 With 4 coloured figs. on 2 plates & 5 text figs. [46 refs.]

The authors in the light of their own observations on material from cases of yellow fever occurring in the French West African possessions



pass in review the various pathological changes previously described in yellow fever. The conclusion is drawn that the lesions in the heart, kidney and spleen are not sufficiently specific to serve as diagnostic criteria. These can be found only in the liver. In order to examine liver satisfactorily tissues should be fixed in formalin for frozen sections. If the liver cells show dissociation and fatty degeneration pieces of tissues should be placed for twelve hours in alcoholic picric formol and then embedded in paraffin. The absence of dissociation of the lobular cords even when fatty changes are present is thought to eliminate the diagnosis of yellow fever. Paraffin sections should be stained either with haemalum, eosin safranin or by Mallory's haematoxylin phosphotungstic acid method. The most important diagnostic feature is believed to be the presence of Councilman lesions: hyaline necroses in the cytoplasm of the liver cells associated with the total disappearance of all nuclear chromatin. These lesions have not been found in a very large number of other conditions affecting the human liver. [In animals these lesions are found in association with other virus infections such as fowl pest, African horse sickness and Rift Valley fever. The last disease attacks man but human tissues from an acute fatal case have not yet been examined.] The presence of intra-nuclear inclusions in the liver cells clinches the diagnosis of yellow fever but these inclusions are not always easy to demonstrate.

G. M. Findlay

MOISTENEGRO (João). Uniformização dos diagnosticos histo-patologicos da febre amarella. *Histopathological Diagnosis of Yellow Fever*—*Brasil Medico* 1938 Jan 15 Vol 52, No. 3, pp 51-59. With 3 coloured figs. [51 refs.] English summary.

The author discusses the lesions observed in liver tissue taken by viscerotome from cases of yellow fever and arranges them in tabular form according to his opinion of their relative significance.

- A. Capital lesion.
  - 1 Councilman-Rocha Lima's cell
- B. Necessary lesions (two or more)
  - 2 Zonal necrosis
  - 3 Disorganization of the liver parenchyma.
  - 4 Medium and macro-droplet fatty degeneration.
  - 5 Intra-cytoplasmic necrosis.
- C. Less valuable but rather common lesions
  - 6 Nuclear changes (swelling, pyknosis, karyolysis, karyorrhexis, nucleolar multiplication, nuclear inclusions resembling tiny nucleoles, nuclear inclusions of the Torres type)
  - 7 Swelling of Kupffer's cells.
  - 8 Swelling of liver cells.
  - 9 Pigmentation.
  - 10 Cellular infiltration of the connective stroma.
  - 11 Sinusoidal dilatation.
  - 12 Hyperemia.
  - 13 Rarefaction necrosis.

Referring to a former publication (see this *Bulletin* 1938 Vol. 35 p 118) the author defines more minutely exactly what he means by the Councilman-Rocha Lima's cell. He states that the liver cell in yellow fever passes through a process of hyaline eosinophile necrosis in certain stages. The nucleus changes from blue to purple-red before disappearing and it is at this penultimate stage with the purple-red

to red nucleus that the cell is most characteristic and it is to the cell in this stage that he gives the name. What are called Councilman's hyaline bodies are the liver cells in any stage of hyaline necrosis. Coloured illustrations depict well the characteristic cells and the zonal and parenchymal necrosis  
H H S

RICKARD (E. R.) *Le service de viscérotomie dans la lutte contre la fièvre jaune au Brésil. (Analyzé par Ch BROQUET)* [The Viscerotomy Service in the War against Yellow Fever in Brazil.]—*Rev d Hyg et de Méd Préventive* 1938 Mar Vol. 60 No 3 pp 175-184

A general account by Ch Broquet based on Rickard's paper [See this *Bulletin* 1937 Vol 34 p 686.]  
E H

CUMMING (Hugh S) *Mesures de quarantaine contre la fièvre jaune [Quarantine Measures against Yellow Fever]*—*Bull Office Internat d Hyg Publique* 1938 Mar Vol. 30 No 3 pp 536-537

The Federal Government of the United States is giving financial support to the local public health authorities at Miami Florida to organize a campaign against *Aedes* in that neighbourhood. They are also opposing a proposal to make Charleston South Carolina an airport terminus for the Pan American Airways in view of the favourable breeding sites for *Aedes* in that district. A special corps is being trained to undertake inquiries into the prevalence of this mosquito in the larger towns of the southern United States and no airport of entry is permitted within twenty miles of any town with a high index for *Aedes*.

The author records the finding of a live *Anopheles maculipennis* in a Chinese clipper arriving at Alameda from Honolulu and consequently these air stations are being disinfested of all mosquitoes  
E H

SOPER (Fred L) *Vacinação contra a febre amarela no Brasil de 1930 a 1937 [Vaccination against Yellow Fever in Brazil, 1930-37]*—*Arquivos de Hig* 1937 Nov Vol 7 No 2. pp 379-390 [15 refs] English summary

Dr Soper gives an interesting account of the development of methods of yellow fever personal prophylaxis as carried out by the Service in Brazil from 1930 to the present. Between 1931 and 1935 fifty persons received human immune serum plus mouse-brain virus in the following year 44 received human anti-serum followed by tissue culture virus and 231 the same virus with small doses of goat antiserum in 1936-37 795 received hyperimmune monkey serum and tissue culture virus and in 1937 more than 20 000 were injected (18 000 in Brazil) with tissue-culture virus alone [i.e. without immune serum]. The virus was suspended in serum (?).

The author concludes. The results with human serum were good but could only be applied to small numbers. Further laboratory study is required before animal sera can be used satisfactorily. Vaccination with virus modified by prolonged growth in chick embryo tissue without serum has proven to be the method of choice. [See also FINDLAY & MACCALLUM this *Bulletin* 1938 Vol 35 p 119.]  
H H S

SOPER (F. L.) & SMITH (H. H.) Yellow Fever Vaccination with Cultivated Virus and Immune and Hyperimmune Serum.—*Amer J Trop Med* 1938 Mar Vol 18 No 2 pp 111-134 [20 refs]

A general summary of the results obtained by the Laboratories of the International Health Division of the Rockefeller Foundation in New York, Bahia and Rio de Janeiro with the use of cultivated yellow fever virus and immune serum.

During 1935-1936 in Brazil, 44 people were vaccinated with human immune serum and a strain of virus cultivated in mouse embryo tissue. The results were satisfactory but can be applied only to small numbers owing to the limited supply of serum and the cumbersome technique. A second lot of 234 persons were vaccinated with the same virus and various pools of immune goat serum. Although immunization was obtained, the method was unsatisfactory owing to the development of serum reactions and delayed febrile reactions with virus in the circulation.

During 1936-1937 790 persons were vaccinated with hyper immune monkey serum and the same tissue culture virus, but probably owing to the greater activity of the monkey antibodies there was a relatively high percentage of failures to immunize which are attributed to the use of excessive quantities of antibody resulting in complete inhibition of the virus.

Of especial interest is the occurrence of a delayed reaction of unknown aetiology, occurring from two to eight months after vaccination similar to that described by FINDLAY and MACCALLUM [See this *Bulletin* 1938 Vol. 35 p 119].

There is no satisfactory explanation for the pathogenesis of this reaction, of which the main symptom is jaundice. A group of 191 persons vaccinated at Campo Grande Rio de Janeiro with two pools of monkey sera and culture virus showed no marked reactions during the 30-day post vaccination period, but 61 or 32 per cent., gave a history of more or less severe illness with jaundice during the period 2 to 8 months after vaccination. Thirty four of them were confined to bed, but all recovered. On the other hand there were no reported cases of delayed jaundice in 428 persons vaccinated in Brazil with other pools of sera, and 192 persons vaccinated with one or more of the virus components used at Campo Grande. E. H.

PELTIER DURIEX (C.) JONCHÈRE (H.) & ARQUIÉ (E.) Action de la bile sur le virus amaril. Recherche d'une vaccination antiamarile par virus bilé [The Action of Bile on Yellow Fever Virus. Studies of Yellow Fever Vaccination with Virus treated with Bile].—*Bull Acad Med* 1937 Dec 7 101st Year 3rd Ser Vol 118 No 37 pp 432-438.

The authors find that serum containing bile neutralizes yellow fever virus and consequently positive sero-protection tests in mice may be obtained with the serum in certain cases of jaundice. When the mixture of virus and jaundice serum is inoculated into mice without delay no neutralization takes place but even after 45 minutes delay the virus content is reduced, and after about 4 hours neutralization is complete. It was found that not all sera possess this action but only those containing total jaundice. When the jaundice is dissociated,

with pigments in the blood and urine but absence of biliary salts the serum has no more action on the virus than normal serum. It was found that a dilution of 1/40 ox bile to normal serum neutralized approximately 5 000 M.L.D. per cc of virus in 30 minutes as determined by intracerebral inoculation into mice.

Two monkeys were inoculated with a dilution of 1/50 yellow fever virus (2,000 M.L.D.) after being exposed for 30 minutes to the action of 1/40 dilution ox bile. One of these monkeys showed a slight febrile reaction on the 6th day and its serum contained yellow fever virus as determined by mouse inoculation. It is evident therefore that the virus is not killed by the bile but only enrobé or coated.

Accordingly, two volunteers were inoculated with the bile virus mixture and both developed a very high titre of yellow fever antibodies in their sera without showing any febrile or other clinical symptoms. The mixture has subsequently been used for the vaccination of a number of individuals and only in three cases was there a slight febrile reaction and in these cases yellow fever virus was recovered from the blood.

It is curious that if one uses either the phosphatic suspension of infected mouse brain or the virus present in a Seitz filtrate the bile destroys the virus completely and the inoculation of such mixtures fails to stimulate the production of yellow fever antibodies. It would seem that the presence of brain tissue is essential for the production of this bile-coated virus. E H

DURIEUX (C) Etude de treize souches de virus amaril isolées par inoculation intracérébrale de sang de malades à la souris blanche [A Study of 13 Strains of Yellow Fever Virus Isolated by the Intracerebral Inoculation of Patients' Blood into White Mice].—*Bull Acad Méd* 1937 Dec 7 101st Year 3rd Ser Vol 118. No 37 pp 438-449

The author has isolated 13 strains of yellow fever by the inoculation of the patients' blood into the brains of mice. This method affords a method of certain diagnosis on condition that the nature of the isolated virus is confirmed by protection tests with yellow fever immune serum.

Mice seem to be preferable to monkeys for diagnostic purposes since at advanced stages of the disease they seem to be more susceptible to intracerebral infection than monkeys are to intraperitoneal inoculation. Neither the gravity of the disease in man nor the time when the blood was collected (up to the 5th day of fever) seemed to influence the receptivity of the mice.

Certain strains of virus were found to be much more virulent than others as determined by the action of anti-sera. Yellow fever virus was found to persist in the blood of yellow fever patients up to the 5th day of fever even approaching the death of the patient.

The author advances the hypothesis that in human cases of yellow fever under the influence of the bile present in the serum the virus loses its viscerotropic but preserves its neurotropic properties for longer periods. In the case of monkeys where the ordinary pantropic virus persists in the blood and organs up till death jaundice is said to be very little developed.

The results of the examination of the blood of subjects prior to yellow fever inoculation show that benign cases of the disease are

common among both Europeans and negroes in French West Africa. These cases constitute a serious danger and emphasize the necessity of yellow fever vaccination for adequate protection. *E H*

SMITH (Hugh H.) The Propagation of Yellow Fever Virus in Mouse Testicle.—*Amer J Trop Med* 1938 Jan. Vol. 18. No 1 pp 77-84

The author has succeeded in propagating four unmodified strains of yellow fever virus in mouse testes *in vivo* by means of serial passages. The virus used included the highly virulent French and Asibi strains, a J F strain from the Brazilian jungle with moderate virulence in monkeys and a strain known as A.F.B. with low viscerotropic and neurotropic properties. Infected monkey serum diluted 1:10 was inoculated into each testis in doses of 0.03 cc. The virus was found to multiply in the testis and to be present in highest concentration after about seven days. After then it gradually diminished and disappeared by about the twenty first day. No generalized infection was produced and only slight local lesions were discernible. Immunity generally occurred after the intra testicular inoculation of adequate amounts of virus but this response was somewhat irregular.

Mouse testis seems to be quite as suitable as mouse brain for the isolation of virus from an infected animal. None of the strains showed any modification after passages in mouse testes. The French strain has now gone through 42 passages, the J F 38, the A.F.B. 23 and the Asibi through 20 mouse testis passages, but in no case has any modification of the pathogenicity of the virus been demonstrated. LLOYD and MARAFFY [see this *Bulletin* 1934 Vol. 31 p 498] succeeded in maintaining a neurotropic virus in mouse testes through nine passages.

*E H*

SOPER (Fred L.) BEEUWES (Henri) DAVIS (Nelson C.) & KERR (J Austin) Transitory Immunity to Yellow Fever in the Offspring of Immune Human and Monkey Mothers.—*Amer J Hyg* 1938 Mar Vol 27 No 2 pp 351-363 [24 refs]

The authors give the results of mouse protection tests with the sera of the offspring of human and monkey mothers immune against yellow fever.

The results with rhesus monkeys in Bahia confirm previous observations [see this *Bulletin* 1934 Vol 31 p 840]. Seven baby monkeys born to immune mothers gave positive immune reactions when tested within twelve hours of birth. Although in some cases positive protection results were obtained at the end of four or five months, in others the initial immunity was lost within three months.

The following table gives the results of comparative tests with human maternal and placental bloods —

	Mothers	Umbilical Cord	
		Positive	Negative
Positive	19	17	2
Negative	59	0	59
Total	78	17	61

These results clearly indicate that yellow fever antibodies pass through the placenta and do not necessarily come from the mother's milk. The duration of this initial immunity was tested in a small group of 11 babies in Rio de Janeiro. Five of the mothers were positive and six negative. The sera of their babies at one to ten days old all gave similar reactions to their mothers, i.e. five positive and six negative. Four of the babies giving a positive reaction were re-examined after 99 to 110 days and all had become negative.

The results of protection tests with babies of less than one year of age and their mothers at Recife Pernambuco are given in the following table —

		Babies							
		Under 2 months		2-4 months		4-6 months		6-12 months	
Mothers		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Positive	81	5	2	4	12	3	17	0	38
Negative	46	0	5	0	6	0	12	0	23
Total	127	5	7	4	18	3	29	0	61

From these results it is evident that the presence of yellow fever antibody in the baby's serum at birth depends on its presence in the mother's serum. This initial immunity present at birth seems to be entirely passive in character and disappears during the first few months of life and susceptibility tests on monkeys after the initial immunity had disappeared failed to show any decrease in susceptibility. From an epidemiological point of view the influence of maternal immunity on the results of protection tests in children may be disregarded after one year and probably after six months. Although the possibility of the transmission of yellow fever antibodies by the maternal milk has not been definitely excluded it does not occur to an extent sufficient to prevent the disappearance of antibodies from the blood of nursing infants before the end of six months. E H

STEFANOPOULO (G. J.) & NAGANO (A.) with the collaboration of R. WASSERMANN. Comportement de certaines espèces animales vis-à-vis de diverses souches de virus de fièvre jaune. Sensibilité du Cynocephale (*Cynocephalus papio*) au virus neurotrope de souris: état réfractaire de ce primate au virus atténué par culture in vitro. [The Behaviour of Certain Species of Animals towards Various Strains of Yellow Fever Virus. The Susceptibility of Baboons (*Cynocephalus papio*) to the Neurotropic Mouse Strain the Resistance of this Primate to Virus attenuated by Culture "in vitro."]—*Bull. Soc. Path. Exot.* 1937 Dec 8 Vol. 30 No 10 pp 892-899 [17 refs.]

Frogs and golden hamsters inoculated with neurotropic yellow fever virus showed no signs of any reaction. In the case of spermophiles inoculated intracerebrally the virus was recovered from the brain

five days later and a second passage was successful but an attempt at a third passage did not succeed.

Ferrets a fox and two gazelles inoculated with the virus showed no signs of infection but subsequently developed protective antibodies.

Two baboons (*C. papio*) were inoculated with viscerotropic virus, one a culture strain but showed no obvious signs of infection although they both developed specific antibodies in the blood. A third animal inoculated intracerebrally with neurotropic virus developed signs of encephalo-meningitis on the seventh day and died on the thirteenth day. Although no inclusion bodies were found in the brain the histopathology showed characteristic lesions, and five mice inoculated with an emulsion of brain tissue and normal serum died of typical yellow fever encephalitis.

E H

FINDLAY (G M) The Spread of Yellow Fever—Reprinted from *Festschrift Bernhard Nocht z 80 Geburtstag von seinen Freunden u. Schülern* Hamburg 1937 pp 143-146

DE ASSUMPTÃO (Lucas) O vírus isolado dos doentes da febre amarela silvestre durante o último surto epidêmico verificado no estado de S Paulo [The Virus Isolated in the Recent Outbreak of Jungle Yellow Fever in São Paulo.]—Reprinted from *Rev Assoc Paulista de Med.* S Paulo. 1937 Nov Vol 11 No 5 pp 275-282. With 11 figs. English summary (Boletim No 61 Inst. de Hyg de São Paulo)

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## RELAPSING FEVER AND OTHER SPIROCHAETOSSES.

SAUTET (Jacques) Etiologie des fièvres récurrentes. [The Aetiology of Relapsing Fevers.]—*Marseille Méd* 1937 Sept. 25 Vol 74 No 27 pp 273-284

A useful summary of the subject containing the table reprinted overleaf showing the principal differences between the various species of relapsing fever spirochaetes. E Hindle

CHUNG (Huei Lan) Filtrability of the Chinese Strain of *Spirochaeta recurrentis*—*Proc Soc Experim Biol & Med* 1938 Feb. Vol 38 No 1 pp 23-26

The author found that the Chinese strain of *S. recurrentis* passes through Berkefeld filters V N and W under a pressure of 5 to 10 lb to the square inch. Plasma containing numerous spirochaetes was used for the filtration experiments and the filtrates examined both by dark ground and animal inoculation. W filtrates and most N filtrates failed to show spirochaetes by direct examination but the author considers that more direct evidence is needed to establish the existence of an invisible or granular form. E H

BALTAZARD (M) Présence au Maroc d'un spirochète type *duttoni* transmis dans la nature par *Ornithodoros erraticus* [The Presence in Morocco of a Spirochaete of the Type *duttoni* transmitted in Nature by *O. erraticus*]—*Bull Soc Path Exot* 1937 July 7 Vol. 30 No 7 pp 551-555

From *Ornithodoros erraticus* collected in the burrows of rodents in Southern Morocco the author has isolated three strains of spirochaetes which in their properties closely resemble *S. duttoni*. They were all highly pathogenic to rats but in guinea-pigs produced only a non apparent infection.

Cross immunity experiments with a Dakar strain of *S. duttoni* (var *crocidurae*) gave only negative results but in view of its pathogenic characteristics the author considers that it belongs to the Dutton group of spirochaetes. E H

DURIEUX (C) ARGUÉ (E.) & CARRIÈRE (Ch) Un cas de fièvre récurrente hispano-africaine importé à Dakar [A Case of Spanish-African Relapsing Fever Imported into Dakar]—*Bull Soc Path Exot* 1937 July 7 Vol. 30 No 7 pp 555-557

The record of a sailor whose ship had called at Casablanca where presumably he had become infected when visiting the native quarters. He was admitted to the hospital at Dakar suffering from an attack of relapsing fever and the spirochaete isolated from his blood by its pathogenicity to guinea-pigs and also by cross immunity experiments was shown to be *S. hispanicum* and not the local strain of *S. duttoni*.

E H



# RELAPSING FEVER SPIROCHAETES.

Spirochaeta	In Man		Symptoms		Susceptible Animals		Transmitting host.		
	No. of spirochaetes in blood	Holiness			Gulose pig	Rats and Mice	Mammalian reservoir of infection.	Name	Transmitted by
<i>S. recurrentis</i> (S. mayeri)	numerous	few - 1	variable mortality 5 to 80 p 100		almost intransmissible	Infection of about duration (3-6 days) except for persistent brain infection	Man	<i>Poliovirus</i> <i>Ammonium</i> 43 p 100	crabbing
<i>S. duttoni</i>	fairly numerous especially in children	5 to 6	benign in adults severe in children mortality 5 to 50%		febrile infection	Infections of long duration especially in the brain	Rodents rats shrews	<i>O. mordax</i> <i>O. mordax</i> <i>O. mordax</i>	coax field
<i>S. hispanica</i>	rather numerous	4 to 6	benign		severe attacks spirochaetes numerous	in	Pig rodents	<i>O. mordax</i>	in
<i>S. turicata</i>	rare	3 to 5	benign		young susceptible adults very little	severe in adults, spirochaetes rare 2 references	rodents armadillo	<i>O. mordax</i> ( <i>O. mordax</i> )	bite
<i>S. armata</i>		2 to 5	+ benign benign		—	slightly pathogenic	warrennet opossum armadillo	<i>O. mordax</i> <i>O. mordax</i>	coax field bite
<i>S. parva</i>		2 to 5	severe		71 p. 100 fatal cases with pneumonitis peritonitis	+	rodents? guinea pig	<i>O. mordax</i>	bite
<i>S. mordax</i>		experimentally (apparent infection)			—	mice susceptible, rats less so	mouse	<i>O. mordax</i>	bite
<i>S. agilis</i>		experimentally			very susceptible	slightly susceptible		<i>O. mordax</i>	bite

CHUNG (Huei Lan) Presence of Spirochetes in the Urine and Prostatic Fluid of Patients with Relapsing Fever—*Proc Soc Experim Biol & Med* 1938. Feb Vol. 33. No 1 pp 97-98.

The urine of 27 (65.9 per cent) of 41 patients infected with Chinese relapsing fever contained spirochaetes morphologically identical with *S. recurrentis*. To facilitate the search 10 cc. of urine was centrifuged at 2,000 to 2,500 revs. per minute for twenty minutes, and the sediment examined for spirochaetes. These were generally non motile but one out of six squirrels inoculated with sediment became infected after eighteen days. Viable and virulent spirochaetes were also recovered from the prostatic fluid of one out of two patients examined. This seems to be the first record of spirochaetes occurring in the urine or prostatic fluid of relapsing fever patients. E H

CHUNG (Huei Lan) The Cerebrospinal Fluid of Patients suffering from the Chinese Strain of Relapsing Fever—*Trans Roy Soc Trop Med & Hyg* 1938 Apr 20 Vol. 31 No 6 pp 625-634 [18 refs.]

A study of the cerebrospinal fluid of 26 patients suffering from the Chinese strain of relapsing fever and all with negative Wassermann reactions in order to exclude syphilis. Of these patients 9 had 1 10 had 2 6 had 3 and 1 had 4 examinations of the fluid obtained by lumbar puncture.

The physical properties of the fluids were generally normal, but in some cases there was a definite increase in the leucocyte counts mainly in lymphocytes and occasionally the pressure was augmented up to more than 210 mm. Pandey's test was weakly positive in 8 specimens and Nonne's test positive in 4 specimens out of 50 examined.

The most striking result was the development of a transient but clear-cut positive Wassermann reaction in 9 out of 16 patients which suddenly became negative 1 to 3 weeks later. This reaction is considered to be related to the relapsing fever infection.

Although spirochaetes were not seen in the dark ground examination of cerebrospinal fluid from 6 patients the inoculation of 7 specimens of this fluid into 7 squirrels was followed by the development of relapsing fever infection in 5 of them. E H

JAHNEL (F) Ueber das Verhalten von Rekurrenzspirochäten im Organismus winterschlafender Tiere [The Persistence of Relapsing Fever Spirochaetes in the Bodies of Hibernating Animals.]—*Ztschr f Immunitätsf u Experim Therap* 1938. Feb 18. Vol. 92. No 2/3 pp 253-269 [21 refs.]

Dormice were found to be very susceptible to infection with both *Spirochaeta hispanica* and *S. usbekistanica* and infection with the latter was often followed by persistence in the brain. When dormice were infected with these two strains and then placed in a cold room to induce hibernation the spirochaetes disappeared from the organism much more rapidly than in control animals kept at ordinary temperatures. On the other hand dormice inoculated with *S. hispanica* whilst in a state of hibernation were still infected after 30 days uninterrupted sleep showing that neither the lower body temperature reduced metabolism nor other (possibly hormonal) effects had been sufficient

to cause their disappearance. The fact that animals inoculated in the hibernating state remain infected longer than those inoculated some time before hibernation supports the view that in the latter animals the general protective mechanism of the body receives a stronger stimulus. The spirochaetes inoculated into hibernating animals do not multiply to the same extent and the body reaction is accordingly weaker.

Nevertheless in the case of *Spirochaeta pallida* inoculated into hibernating dormice all traces of the infection die out within 4 days, whilst control animals retain virulent spirochaetes for much longer periods.

The effect of hibernation on *S. pallida* is much stronger and quicker than in the case of relapsing fever spirochaetes. E H

SIBILIA (Danielo) Tentativi di modificare sperimentalmente nel sangue periferico di ammalati di febbre ricorrente i reperti spirochetici negativi [Attempts to facilitate Diagnosis of Relapsing Fever in Patients in whose Blood Spirochaetes are not found.]—*Polidrmico Sez Med* 1937 Oct 1 Vol. 44 No 10 pp. 530-532

The author tried by the use of adrenalin intravenously 0.1 mgm. and of tuberculin subcutaneously 0.5 cc. of 1 in 1,000 dilution to throw into the circulation the spirochaetes of relapsing fever in patients whose blood—by smear or by thick drop—was negative to microscopical examination. The experiments were carried out on 22 Askaria in hospital at Addis Ababa. The attempts were unsuccessful. If none was seen by the usual method none appeared after the injections.

ANGELINI in a paper in the press [but quoted by the author though apparently not yet published] has tried spleen puncture and examination of bone-marrow for the same purpose but similarly without result. Since the blood of patients may be infective even though spirochaetes are not found the author concludes that the organism passes through a phase when it is invisible or ultramicroscopic.

H H S

FELDT (Adolf) Ueber Interferenzversuche bei Spirochaeteninfektionen I. Brillantgrün, Solganal und Neosalvaran [Interference Studies on Spirochaetal Infections. I. Brilliant Green, Solganal and Neosalvaran.]—*Ztschr f Immunitätsf u Experim Therap* 1938 Apr 20 Vol 92 No 6. pp 519-533 [24 refs.]

A further study of interference phenomena extending the observations of Bau Kien Hui [see this *Bulletin* 1938 Vol 35 p 127].

The author found that a fresh solution of Brilliant Green inoculated subcutaneously killed normal mice in dilutions of 1:1,500 in 24 hours whilst mice heavily infected with *S. recurrentis* died after injections of 1:2,000 of the dye. It is a strong local irritant and subcutaneous injections are followed by the development of necroses in which a large part of the colouring matter is held back.

Solganal has a marked antagonistic action against Brilliant Green and both normal and infected mice infected with lethal doses of this dye remain alive if 3-4 hours later they receive intravenous inoculations of 1:500 Solganal. Similar results were obtained with four

different strains of relapsing fever—*S recurrentis* *S novyi* *S hispanica* and *S usbekistanica* but only when they showed similarly heavy infections. The negative results recorded by Kien Hun are considered to be due to the different intensities of the infections in his experiments. It is also necessary to use the smallest curative dose of Solganal for each strain.

No antagonistic action was found between Brilliant Green and Neosalvarsan and the curative dose of this drug was not affected by previous injections of the dye.

The interference phenomena between Brilliant Green and Solganal observed in mice infected with relapsing fever spirochaetes seems to depend on a functional injury of the protective mesenchyme system whereby the resistance of the host to the infection is lowered. The experimental results with Solganal support the view that this drug acts indirectly on the spirochaetes.

In the case of mice infected with trypanosomes the results of interference experiments are different since there is a direct action of the drug on the parasite.

E H

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## LEPTOSPIROSIS.

MEYER (K F) EDDIE (B) & ANDERSON STEWART (B) Canine, Murine, and Human Leptospirosis in California.—*Proc Soc Experim Biol & Med* 1938. Feb Vol. 38 No 1 pp 17-19

The study of a very fatal disease affecting with increasing frequency the older dog population of San Francisco and the vicinity revealed the presence of leptospira in the tissues. The post mortem findings on 67 dogs arranged themselves into two groups the Icteric type (33 individuals) corresponding to the so-called Weil's Disease and the Haemorrhagic type (36 individuals) resembling Stuttgart Disease.

In spite of many efforts cultures of leptospira were obtained from only six dogs which were definitely jaundiced. These strains produced only transitory non fatal infections in young guineapigs and neither the original tissues from 40 dogs nor several cultures infected white mice and rats. These strains were identified by SCHÖFFNER as *L. canicola* but in producing the development of icterus the Californian strain differs from the Dutch strain. A veterinarian infected with this Californian dog strain showed a definite icterus and nephritis and his serum eight months after recovery agglutinated *L. canicola* in a dilution of 1:300 and *L. icterohaemorrhagiae* in 1:30.

Typical Weil's disease has been diagnosed in San Francisco and the random examination of the kidneys of 420 rats (*Mus rattus* *M. alexandrinus* and *M. norvegicus*) by dark ground illumination gave 139 positive for leptospira (33 per cent). In the vicinity of a stable 42 out of 44 old *M. norvegicus* were infected. Twenty two strains isolated by guineapig passage all produced fatal infections with jaundice after one two or three passages. *L. canicola* was not found

In the rat population so that the host relationship of these two spirochaetes in California is almost certainly the same as in Holland rats being the source of typical Weil's disease and dogs the reservoir for *L. canicola* [see below] E Hindle

WALCH-SORGDRAGER (B) & SCHÜFFNER (W) Die Selbständigkeit der *L. canicola* [The Individuality of *L. canicola*]—*Zent f Bakt.* I Abt Orig 1938 Mar 4 Vol 141 No 3/4 pp. 97-109 [18 refs.]

A valuable summary of the authors observations on material collected mainly in the Netherlands during the past four years, showing the relative prevalence of various types of leptospira.

The serum reactions of 55 dogs examined during 1937 at Professor Klarenbeek's clinic in Utrecht are given in tabular form showing their reactions with a typical *canicola* strain H Utrecht IV and a classical Weil strain Wynberg. Thirty-one of the dogs known to be infected with *canicola* gave reactions with H Utrecht IV strain to at least one tenth the dilution of those with the Weil strain whilst of the 21 dogs infected with typical Weil's disease reactions were obtained with the Wynberg strain in much greater dilutions than with *canicola*. In only three dogs were the reactions with the two strains indistinguishable.

Sixteen canine and three human strains of *L. canicola* isolated from the urine were tested with rabbit antisera against a typical Weil strain and *L. canicola* respectively and whilst the reactions with the latter were all positive in dilutions of 1:30,000 the reactions with Weil antiserum were never positive in dilutions of more than 1:3,000.

Infection with *canicola* seems to be commoner in dogs than Weil's disease judging by the results of a serological examination of 48 dogs in Haarlem and the neighbourhood, by Dr D. J. KOK. Twenty-six dogs including all those under one year old (10) were negative, but of the remaining 22, 13 gave reactions indicating previous *canicola* infection against 9 positive for typical Weil's disease.

With reference to the clinical symptoms in man Canicola-fever is distinguished from Weil's disease mainly by the absence of jaundice. In addition meningitic symptoms seem to be common and much more severe than in typical Weil's disease. In guinea-pigs, infection is rather less severe than *L. icterohaemorrhagiae* but its virulence increases on passage. Seven died out of 28 animals infected directly from the urine of dog or man, whilst in the next passage 9 died out of 12. Only 2 out of 28 showed jaundice in the first passage and in the second passage only two individuals.

When *Mus rattus*, *M. decumanus* and white rats were inoculated with *L. canicola* the organisms persisted in the peritoneum for a few days but the urine never became infected in marked contrast to Weil infections. It is evident that rats are not the carriers of *L. canicola* a fact supported by the serological examination of 104 rat strains, none of which was identified as *canicola* and the examination of rat sera from San Francisco where the disease has been identified in dogs, gave similar results.

The disease seems to be essentially an epizootic of dogs, probably with a widespread distribution, from which man occasionally acquires the infection. E H

TETZNER (Ernst) Serologisch sichergestellter Fall von Weilscher Krankheit—Typ *Leptospira canicola*—beim Menschen unter dem Bilde einer Meningitis. [The Serological Identification of a Case of Weil's Disease—Type *Leptospira canicola*—In Man, having the Appearance of Meningitis.]—*Klin Woch* 1938 Apr 2. Vol. 17 No 14 pp 508-509

The description of a case of infection with *L. canicola* in a 41 year old woman in Hamburg who almost certainly acquired the disease from a spaniel in her house that had been infected with Stuttgart Disease.

The symptoms were mainly meningitic and there was no jaundice or colouration of the sclera. Agglutination and complement fixation reaction with *L. icterohaemorrhagiae* and *L. canicola* respectively were positive with the latter in much higher dilutions supporting the diagnosis of infection with the canine form of leptospirosis. The patient made an uninterrupted recovery. E H

PACKCHANIAN (A.) La spirochétose ictérohémmorragique (maladie de Weil) aux États-Unis. [Spirochaetal Jaundice (Weil's Disease) in the United States.]—*Bull Office Internat d'Hyg Publique* 1937 Nov Vol 29 No 11 pp 2350-2353

From time to time sporadic cases of Weil's disease have been observed in the United States, and it is probably more widespread than is generally believed. The author gives an historic review of various epidemics with symptoms suggestive of this disease and finds records of only eleven outbreaks between 1812 and 1886 but between 1880 and 1900 they become more frequent and in one year 51 epidemics were recorded.

The outbreaks often coincided with concentration of troops and generally occurred in autumn and winter but in most of the cases there is only clinical evidence of the nature of the disease.

Wild rats are infected with the spirochaete in proportions varying from 4 to 30 per cent and in addition the author found laboratory mice naturally infected with the strain. E H

JOLLY (A) & DANGLEMONT (F) Sur un cas de maladie de Weil à la Guadeloupe (spirochétose ictéro-hémorragique) [A Case of Weil's Disease at Guadeloupe (Spirochaetal Jaundice)]—*Bull Soc Path Exot* 1937 July 7 Vol. 30 No 7 pp 557-562.

The authors give details of a patient showing typical clinical symptoms of Weil's disease associated with the presence of active spirochaetes in the urine. Nevertheless the inoculation of these organisms into guinea-pigs did not reproduce the infection.

This isolated case from Pointe-à Pitre is the first record of Weil's disease from Guadeloupe. The infection is attributed to rats.

E H

BALARD LE LOURD & DUHART A propos d'un cas de spirochètose ictéro-hémorragique ayant entraîné l'avortement chez une malade atteinte antérieurement d'une néphrite chronique [Concerning a Case of Spirochaetal Jaundice producing Abortion in a Patient previously Suffering with Chronic Nephritis.]—*Gaz hebdomadaire de Bordeaux* 1938. Apr 10 Vol. 59 No 15 pp. 229-233

A detailed description of the symptoms of an abnormal case of infection with *L. icterohaemorrhagiae* in a pregnant woman who also suffered from chronic nephritis. There was little fever no relapses, no jaundice or haemorrhages and in spite of the serious renal condition, the azotaemia was not as high as in most cases of Weil's disease.

A pericarditis developed during the attack but disappeared together with the spirochaetosis.

In a discussion of the nature of this pericarditis the authors incline to the view that it was of an infectious type caused by the predisposing humoral condition resulting from the renal disease. E H

KIRK (R) Attempts to demonstrate Leptospirosis in the Northern Sudan.—*Trans. Roy Soc Trop Med & Hyg* 1938. Apr 20. Vol 31 No 6 pp 667-670 [10 refs.]

Jaundice is a frequent clinical condition in the Sudan but hitherto the spirochaete of Weil's disease has never been found in spite of the bacteriological and serological investigation of various outbreaks of sporadic jaundice.

A total of 259 rats in the Northern Sudan have been examined by dark ground illumination, guinea-pig inoculations and agglutination tests but with uniformly negative results so that it would seem that Weil's disease is either absent or extremely rare in this part of the world. It is possible that the arid desert environment is not favourable for the survival of the leptospira outside the body.

The jaundice occurring is apparently an infective type of unknown aetiology but presents certain resemblances especially in the histology of the liver lesions, to an obscure infective disease associated with jaundice described from Nigeria (see this *Bulletin* 1931 Vol 28, p 858). E H

BLUMENBERG (W) Ueber die Weilsche Krankheit als Laboratoriums- und Stallinfektion [Weil's Disease as a Laboratory and Stable Infection.]—*Zent f Bakt* I Abt Orig 1937 Vol 140 No 3/8 Beiheft. pp. 100\*-103\*

A description of three cases of Weil's disease one fatal among laboratory attendants. There were no details of the incubation period of the fatal case but in the others it was 9 and 5 to 6 days respectively.

The infections were almost certainly acquired from rats and in order to avoid such accidents the author recommends that great care should be taken to avoid the possibility of any experimental white rats coming into contact with wild rats. In all institutes where rats are kept attention should be called to the danger of infection and attendants should wear rubber gloves when handling them. Animal houses in which they are kept should be carefully labelled, and, finally, it is

recommended that cages containing rats should never be kept on shelves on a level with the face because of the danger of contamination of the conjunctivae from infected urine.

E H

NAFTALIN (Reuben) Weil's Disease following a Motor-Car Accident.—*Brit Med J* 1938 Mar 19 p 621

The record of a fatal case of Weil's disease following a motor car accident in which the car fell into a canal—the Fosdyke Navigation Canal near Lincoln. The patient swallowed a good deal of the canal water and required artificial respiration after being rescued. After five days he developed severe cramp-like pains in the legs and five days later complained of sickness and malaise. He died twenty days after the accident and the post-mortem changes were typical of Weil's disease. *Leptospira icterohaemorrhagiae* was found in the liver kidney and spleen but not in the lungs. Two other passengers in the car also half-drowned in this canal made uneventful recoveries from the accident.

E H

REITER. Constatations nouvelles relatives à la maladie de Weil et à la gastroentérite hémorragique infectieuse des chiens (Stuttgarter Hundeseuche) [New Facts concerning Weil's Disease and Infectious Gastroenteritis of Dogs (Stuttgart Disease)]—*Bull Office Internat d'Hyg Publique* 1937 Nov Vol 29 No 11 pp 2343-2349

The author gives the results of a serological examination of about 100 dogs suffering from undoubted Stuttgart Disease and states that in every case the serum contained antibodies against *Spirochaeta icterohaemorrhagiae*. However many strains of leptospira were used in these tests and the results obtained varied considerably with different strains. A polyvalent immune serum prepared from several strains was found to have a marked curative effect on dogs infected with Stuttgart Disease especially when it was used at early stages of the disease.

There can hardly be any doubt that Stuttgart Disease in dogs is caused by the same pathogenic agent as Weil's disease and occasionally the disease has been transmitted from dog to man. In some cases the serum of infected dogs did not react with *S. canicola* or any other strains isolated from dogs but only with human strains of *S. icterohaemorrhagiae*.

The author is of the opinion that all the Weil-type spirochaetes including *S. icterohaemorrhagiae*, *S. canicola* and *S. grippo-typhosa* have a similar antigenic structure but show many immunological variants. *S. hebdomadis* on the other hand, is stated to present well marked differences and to be a distinct species.

E H

ASAHINA (Kazuo) Positive Hanganutzun Deichersche Reaktion bei endemischem Fieber in Süd Japan (Toxa *Yatsu*) [Positive Hanganutzun-Deichersche Reaction in Endemic Fever in South Japan.]—*Nagoya J Med Sci* 1937 Oct. Vol 11 No 3 pp 79-82.

A positive H.D. reaction is the agglutination of heterologous red cells by the sera of patients. This positive reaction has been noted in Europe in infectious lymphocytosis or glandular fever. Similar fevers are met with in Japan under various names in different districts



but all are types of glandular fever with sore throat and lymphocytosis among them being Hasami-netsu and Akdyami, spirochaetal diseases [see this *Bulletin* 1936 Vol 33 p. 59] It was found by the author that the sera of these cases agglutinated the red cells of sheep D H

### RAT BITE FEVER

DAS GUPTA (B M) Experiments on the Spirillum of Rat Bite Fever — *Indian Med Gaz* 1938. Jan. Vol. 73 No 1 pp 14-17 With 2 figs [20 refs.]

Three litters born of mice infected with *Spirillum minus* failed to show any signs of infection and infection was not produced in mice by feeding them with urine containing the spirilla, or contaminated food. An infected male was kept with a normal female for several weeks but neither this individual nor its offspring became infected.

Two experimentally infected human volunteers gave consistently negative Wassermann reactions but four guineapigs infected from one of these cases all developed positive reactions.

A comparative study of the prevalence of the spirilla in the blood and peritoneal fluid of mice shows that the number of spirilla in the latter does not diminish appreciably over long periods whilst there are marked fluctuations in the numbers in the blood.

An experimentally infected human volunteer after three bouts of fever was treated with anspbenamine and recovered. He was re-inoculated with the spirillum respectively two months and eight months later but proved refractory to further infection.

E Handle

DAS GUPTA (B M) Spontaneous Infection of Guineapigs with a Spirillum, presumably *Spirillum minus* Carter 1887 — *Indian Med Gaz* 1938 Mar Vol 73 No 3 pp 140-141 With 1 fig

The author in the course of studies on leptospiral infections in guineapigs found that 4 out of 42 harboured a natural infection with a spirillum morphologically identical with *S. minus*. Since both mice and guineapigs may be spontaneously infected with this organism it would seem necessary to examine previously the peritoneal fluid of any animals used for diagnostic inoculation. E H

RUSSELL (Seymour) Il passaggio dell'agente del sodoku nel latte (Presence of the Spirillum of Rat Bite Fever in the Milk.) — *Arch Ital Sci Med Colon e Perassit* 1938 Jan Vol 19 No 1 pp 14-18. With 1 fig

The author injected pregnant rats and guineapigs subcutaneously and intraperitoneally with blood containing *Sp. morsus muris*. Subsequent examination of the milk of these animals revealed the presence of the organism—in smaller numbers than in the blood—and further inoculation into other animals showed that they were still pathogenic.

H H S

## MALARIA

ANDREWS (Mary N.) & CHU (Tso-Chih) Note on a Malaria Survey in Kiao-Chiao.—*Chinese Med J* 1937 Dec Vol. 52. No 6 pp 884-886

Kiao-Chiao is in the municipal area of Greater Shanghai. The school children were examined in the summer autumn and spring terms. Of the 7 766 bloods examined malaria parasites were found in 324 4.2 per cent. The positive findings were highest in the autumn 8.0 per cent and lowest in the spring 1.7 per cent. *Pl. vivax* was found in 281 malarias in 24 and *falciparum* in 19. A large proportion of the positive films contained gametocytes. Norman White

LEGA (G.) RAFFAELE (G.) & CANALIS (A.) Missione dell'Istituto di Malarologia nell'Africa Orientale Italiana [Mission of the Istituto di Malarologia to Italian East Africa].—*Riv di Malarologia* Sez. I 1937 Vol. 16 No. 5 pp 325-387. With 7 plates (5 maps 1 folding) & 17 figs. English summary.

During a four months tour the Mission carried out a preliminary survey of malaria conditions in Entrea Amhara Shoa Harrar and Somaliland. Malaria is widespread. At altitudes of 2 000 metres and upwards malaria is practically non-existent. At heights of 1,500 metres the disease occurs but is not severe where it occurs *vivax* infections predominate. There are areas situated at altitudes of from 1 000 to 1,200 metres in which the disease is very prevalent and spleen indexes up to 90 per cent are to be found. Here the epidemic seasons are from April to June and from September to November and *falciparum* is more in evidence than is *vivax*. Similar conditions prevail on the eastern slopes at slightly lower altitudes. On the western slopes malaria is much less of a scourge and *vivax* infections predominate. An explanation of the lower prevalence here is probably to be found in the relatively few populated areas and the distance of some of these from anopheline breeding places. In the low lying plains the prevalence of malaria though high enough is less than in the lower hills and, in general *vivax* infections are more frequent than *falciparum*. In the eastern plains *vivax* infections constitute from 60 to 75 per cent of the total the epidemic season extending from December to March. In the western plains *falciparum* infections occur more frequently in some places contributing 50 per cent. of the total cases. In Somaliland *vivax* infections outnumber *falciparum* here too the malaria seasons are April to June and October to November.

From the clinical point of view the authors state that the symptoms caused by *vivax* infections are commonly more severe than in Italy, on the other hand *falciparum* infections are apt to be relatively mild. Certain *falciparum* cases harboured parasites with unusual features these have been made the subject of another contribution in this number of the *Rivista* (see RAFFAELE & LEGA this *Bulletin* 1938 Vol. 35 p 418).

Anophelines are numerous and widespread. Circumstances did not permit a study of the habits and other biological characteristics of the anophelines found. The following species were collected *cineerens christyi demeilloni d'itali junestius gambiae garnhami mauritanus*

*pretoriensis rhodesiensis squamosus turkheadi* and *irelandi* At high altitudes *cineurus* and *demeilloni* occur the former predominating  
A II

PIETRO (Lavezoni) Contributo allo studio della malaria del tropici  
[Contribution to Study of Malaria in the Tropics].—*Giorn Ital di Clin Trop* 1938 Feb 28 Vol 2 N S No 2 pp. 39-40  
43-8 49-52, 55

The author relates his experience of malaria in the lower and middle plains of western Eritrea. A general description is given of the country. Each year there is an increase of malaria prevalence at the beginning of the rains in July and after September to November. *A. costalis* is the most important vector. *A. maculipennis* is less prevalent in infections, the remainder being mixed infections of *falciparum* and *irritans*. Malaria acquired in the lower plains is much more severe and more resistant to quinine than the malaria of the higher regions, at altitudes round about 1400 metres. Thirty three representative cases of the latter are briefly described as are 27 cases of infection acquired in the lower plain all European cases. Much space is given to a description of the treatment generally adopted which lacks nothing on the score of thoroughness. A complete course of treatment lasts more than two months and includes plasmoquine-quinine intramuscularly quinine intravenously atabrin by mouth a series of intravenous neosalvarsan injections plasmoquine by mouth, and a generous dosing of quinine by mouth. A time-table of this elaborate treatment is given. The results are stated to be good. A II

LORDICZ (Francis) Malaria in Hungary.—*Riv di Malariologia*.  
Ses I 1937 Vol 16 No. 6 pp 465-479 With 2 figs.

Published information regarding the incidence of malaria in Hungary is almost non-existent a fact which gives interest to this paper though the information it contains is somewhat scanty. Malaria was made a compulsory notifiable disease in Hungary in 1927. Four years later the State Institute of Hygiene undertook the free examination of blood smears from suspected cases of malaria. These two measures constitute the basis of the information recorded. Eighty per cent. of all cases notified have been reported from three counties in the north-east and from three counties in the south-west of the country. Elsewhere only sporadic cases have been notified. The highest number of cases notified in any one year was 1934 there were indications however that the 1937 total would exceed 4,000. The increase in recent years is probably due primarily to more complete notification. Of the positive smears examined in the Institute 91 per cent. were *irritans* and 8 per cent. *falciparum*. There is evidence that *A. maculipennis* var. *typicus* and *maculipes* are the most important vectors. *atroparvus* is found chiefly in the central plain, where it breeds in slightly brackish water and where malaria is rare. N IV

SWELLENDORFFEL (N H.) & KRAAN (H.) Ueber die Malariaerkrankung bei Säuglingen und Erwachsenen in Nordholland (Malaria Martini in Northern Holland in Children and Adults).—Reprinted from *Festschrift Bernhard Nocht* 80 Geburtstag von seinem Freundes u. Schülern Hamburg 1937 pp. 620-624 With 2 charts.

HOME (A. R.) An Outbreak of Malaria on Shipboard.—*Health Canberra*. 1938. Jan. Vol. 16 No 1 pp. 10-11

An account of an outbreak of malaria of unusual severity on board ship *ss. Trefusis* sailed from Cardiff with a cargo of coal for Dakar where she arrived at the end of September. She was in that port nine days mosquitoes were very prevalent. Between 5 and 32 days after leaving Dakar there were 13 cases of malaria among a ship's company numbering 33. Two cases were fatal. The ship carried no surgeon but throughout her voyage to Australia *via* the Cape she was in wireless communication with passing ships carrying surgeons or with shore wireless stations from which medical advice could be obtained.

N IV

LEGENBRE (F. M. A.) Première enquête d'ensemble sur l'endémicité palustre au Cambodge [First General Inquiry on Malaria Prevalence in Cambodia].—*Ann de Méd et de Pharm Colon* 1937 July-Aug-Sept Vol 30 No 3 pp 964-975

Except for certain rubber plantations and a few towns little has been published hitherto concerning the intensity of endemic malaria in different parts of Cambodia. The present report is the first attempt to make good the deficiency. It records the results of the blood examination of groups of children, aged from 2 to 12 in different parts of the country. Cambodia quadrilateral in shape covers an area of 175 000 square kilometres and is bordered by Siam, Laos, Annam Cochinchina and the Gulf of Siam. The central plain is magnificently watered by the Mekong and the Bassac.

From the present limited inquiry it appears that malaria is not very severe in Cambodia except for certain mountainous and wooded regions and along the shore of the Gulf of Siam. None of these intensely malarious regions are densely inhabited. The majority of the population live along the banks of the big rivers. Here malaria occurs but sporadically. *Pl. falciparum* and *Pl. vivax* both occur. *Pl. malariae* is very rare. Spleen indexes generally approximate parasite indexes. Further inquiries are being carried out at different seasons of the year. There are two malaria seasons, one at the beginning the other at the end of the rainy season, which extends from May to November. The rains in Cambodia transform the large central dry desert into a veritable lake.

N IV

DECOURT (Ph.) La lutte antiplasmodiale. Ses facteurs humains (deuxième mémoire) [Human Factors of Anti Plasmodial Measures].—*Bull Soc Path Exot* 1938. Feb 9 Vol. 31 No 2 pp 133-147

In the first part of this paper published in the January number of the *Bulletin de la Société de Pathologie Exotique* the author expatiated on the importance of movements of population in the dissemination of malaria. The dependence of the gravity of malaria on the resistance of the human organism and on the fact that, other things being equal, the severity of endemic malaria varies inversely with the density of the population affected. To this latter point he returns. It explains why malaria is less severe in towns than in rural areas even if the anopheline density be high. In rural areas too increased population

with more intensive cultivation, tends to decrease anopheline prevalence. Reference is made to the influence of standard of living and all that this implies, on the severity of endemic malaria. Several examples are quoted. Such discussions lead to a consideration of the manner in which fertile country sterilized by malaria, can be repopulated and made productive without the disasters that accompanied such attempts in years gone by. In most malarious countries the wholesale bonification so successfully applied in parts of Italy is ruled out on the count of cost. For most countries outside Europe the total cost of measures necessary for reclaiming such territory must not exceed 200 000 francs for each 1,000 persons definitely installed, if such an undertaking is to be carried out by Government agency. Experience in very diverse conditions has shown this to be quite possible. In such reclamation work antianopheline and antiparasitoid measures must be combined. A II

WATSON (R. B.) KIKER (C. C.) & JOHNSON (H. A.) The Role of Airplane Dusting in the Control of Anopheles Breeding associated with Impounded Waters.—*Public Health Rep.* 1938 Feb 18. Vol 53, No 7 pp 251-263 With 8 figs (7 on 4 plates)

This is a description of airplane Paris-green dusting experiments carried out on a specially selected area of Lake Wheeler in the Tennessee Valley. The conclusion is reached that in suitable conditions airplane dusting is a practical and relatively economical larvicidal operation. Excellent results are obtained in rather open water with low emergent vegetation where other larvicidal measures are impractical. Where the water surface is covered with dense horizontally locking vegetation effectual control of Anopheles breeding is not obtainable. The cost of operating a dusting airplane is about \$40 per hour. An airplane flying at 80 miles an hour can treat an area of 33 acres per minute. It is important to secure landing places at which the airplanes can be loaded as near the area to be treated as possible. Suitable time for dusting was limited to the early morning when there was least wind and air conditions were less bumpy. The usual height of flying was 25 feet—one flight at 75 feet gave good results. It is however difficult to place the dust accurately at heights over 30 feet. At 25 feet the width of water effectively dusted may be 300 feet. N II

PIVOVAROV (V. M.) & GUTERMAN (E. M.) L'emploi de l'anabadust dans la lutte contre les moustiques hibernants. [The Use of Anabadust for Elimination of Hibernating Mosquitoes.]—*Med. Parasit. & Parasitic Dis.* Moscow 1937 Vol 6, No. 3 [In Russian pp 424-432 French summary p 432]

Anabadust appears to be a preparation of *anabasine* an alkaloid obtained from *Anabasis aphylla* one of the chenopodiaceae growing on the salt steppes of Trans-Volga and also in N. Africa, Armenia and elsewhere. It has been identified as 3-pyridyl-2-piperidine and as having a structure similar to neonicotine. It is a powerful insecticide of the nicotine type.

According to the authors it does not kill the insects at once but paralyzes the motor centres and death occurs in 1-3 days in 98-4 per cent. of the insects. It affects only those mosquitoes with which the powder actually comes into contact hence it is necessary to have good

dispersion. It is cheaper than sulphur and has the further advantage that there is no need of preliminary preparations of the dwelling in which it is to be used—it does no harm to vegetation food or clothes.

H H S

MANOHAR (K. D.) & KHOSRAWY (K. K.) Anginal Pain in a Case of Malaria.—*Indian Med Gaz* 1938 Mar Vol 73 No 3 pp 151-153 With 3 figs.

This is a description of a case in which severe anginal pain cyanosis rapid pulse and low blood pressure marked the onset of an attack of malignant tertian malaria. The Wassermann reaction was positive during the acute attack there was no history or other evidence of syphilis. Complete recovery followed treatment with quinine. Reference is made to the literature of cases of malaria accompanied by anginal symptoms

N IV

COMŞA (Gh.) & BRUCKNER (I.) Deux cas de paludisme accompagné d'urticaire et douleurs abdominale aiguës. [Two Cases of Malaria accompanied by Urticaria and Acute Abdominal Pain.]—*Bull et Mém Soc Méd Hôpit de Bucarest* 1938. Jan Vol. 20 No 1 pp 1-6.

Both the patients described in this paper were admitted to hospital suffering from fever very acute abdominal pain severe headache and a generalized urticarial rash. Blood examination in both revealed the presence of *Pl vivax*. The condition of one patient was for a time very serious—he was in a state of collapse. Both patients responded promptly to quinine and recovery was rapid and complete. The author refers to similar cases that have been recorded and discusses the manner in which malaria infection may give rise to such symptoms.

N IV

WILLOUGHBY (H. M.) A Case of "Choreiform" Malaria.—*Jl Roy Nav Med Serv* 1938 Jan Vol 24 No 1 pp 71-72.

A boy aged 18 was admitted to hospital with a temperature of 101.4°F. He was very restless there was incessant blinking of the eyelids and uncontrollable jerking of the arms. His head wagged from side to side as he talked and there was purposeless movement of the facial muscles. Heart was slightly enlarged to right of sternum there was a mid-diastolic murmur. There was no enlargement of the spleen. The condition simulated a severe case of chorea. The fever was intermittent the blood was examined and found to contain numerous ring forms of *Pl vivax*. Quinine was given and the choreiform symptoms ceased abruptly.

N IV

MELMAN (José) Um caso rebelde de unpaludismo na criança [A Refractory Case of Malaria in Childhood.]—*Hospital*. Rio de Janeiro 1938 Mar Vol 13 No 3 pp 513-516 With 1 chart

Description of a case of *falciparum* malaria in a child four years of age which failed to yield to prolonged treatment with quinine. A five-days course of atebryn and plasmoquine resulted in cure and rapid

II Quinicine is a structural isomerase of quinine formed by the conversion of the  $\text{CHOH}$  group into the carbonyl group  $\text{CO}$  and the scission of the quinclidine nucleus with the formation of a piperidine ring (P) and belongs to the type represented by the general formula  $\text{QCOCH}_2\text{CH}_2\text{PCH}_2\text{CH}_3$ . It is known to be inactive and it is now shown that the two stereoisomeric quininols formed by the reduction of the  $\text{CO}$  group to  $\text{CHOH}$  are inactive even when the further change  $\text{NH} \rightarrow \text{NCH}_3$  is made in the piperidine ring. In these substances the quinoline and piperidine rings are separated by a 3-carbon chain, and to bring the type nearer to the cinchona alkaloids proper bases represented by the general formula  $\text{QCHOH.C}_6\text{H}_4\text{N.H}$  in which Q is again a quinoline or 6-methoxyquinoline residue and  $\text{C}_6\text{H}_4\text{N.H}$  a piperidyl group were synthesized after considerable experimental difficulties. 4-Quinolyl- $\alpha$ -piperidylcarbinol  $\rightarrow \text{C}_6\text{H}_4\text{N.H}$  a  $\rightarrow \alpha$ -piperidylcarbinol and a series of their  $\text{N}$ -alkyl derivatives ( $\text{C}_6\text{H}_4\text{N.H}$  inactive but the two diastereoisomeric 4-(6-methoxyquinolyl)- $\alpha$ -piperidyl-carbinols were active the more active form being that with melting point  $162-163^\circ$  which has about the same M.T.D. as quinine and is about half as effective in terms of the therapeutic index. These are the first two active synthetic substances constructed on the cinchona alkaloid pattern to be prepared. The  $\text{N}$ -alkyl derivatives in both the quinolyl and 6-methoxyquinolyl series were inactive.

T A Henry

OVERBEEK (J G) & GILBERT (A P W) Vergelijkende proeven in atebriene en chinine per os gedurende een epidemie te Rantjapake in het regentschap Tasikmalaya van 14 Augustus tot 17 September 1936. [Comparison of Atebrin with Quinine by Mouth in a Malarial Outbreak.] *Meded. Dienst d. Volksgezondheid in Nederl. Indië* 1937 Vol. 26. No 4 PP 337-342 With 3 graphs. English summary.

Of 100 cases of benign tertian malaria 53 were treated with atebriene, 0.3 gm a day for five days and 47 with quinine 1.3 gm a day for seven days. There was no significant difference between the rates of action of the two drugs on the parasite but three weeks after treatment 34 per cent of the quinino group harboured parasites as compared with 5.6 per cent of the atebriene group.

In the case of one of the atebriene patients treatment was followed by acute mental disorder which lasted fourteen days. A month later he had a second attack of malaria, anxiety and mental confusion followed the administration of 0.3 gm of atebriene. The treatment was continued for three days but fever and parasites persisted. The administration of 1 gm of quinine reduced the temperature to normal and the patient became quieter.

N II

Miyahara (Hideo) Studies in the Treatment of Malaria. XVII. On the Therapeutic Value of Atebrin.—*Taiwan Igakkaï Zasshi* (Jl. Med. Assoc. Formosa) 1933. Jan Vol. 37. No 1 (394) [In Japanese pp 83-90. English summary p 91.]

Experience gained in Formosa by treating 30 cases of malaria with atebriene 0.30 gm a day for five days has led the author to consider atebriene no more effective than quinine in so far as the prevention of

relapses is concerned. The parasite relapse rate was determined by the frequent examination of the blood thick film method during eight weeks following the completion of treatment. The relapse rates are given by the author as follows: in 13 cases of *vivax* infection 62 per cent; in 12 cases of *falciparum* infection 23 per cent; and in 5 cases of *malariae* infection 7 per cent. N IV

GARIN (Ch) Réduction rapide de la splénomégalie palustre aiguë et chronique par le traitement mixte atébrine plasmoquine. Modifications humorales sous l'influence de ce traitement [Rapid Reduction of Acute and Chronic Malarial Splenomegaly by Treatment with Atebrin and Plasmoquine]—*Rev Prat Malad des Pays Chauds* 1937 July Vol 17 No 7 pp 301-4 307 With 1 fig

An account of two unusual cases of malaria. The first a woman aged 26 was infected with *falciparum* malaria for the first time in Corsica in September. Two months later she was admitted to hospital with fever; the spleen reached below the umbilicus; there were schizonts of *falciparum* in the blood; her serum agglutinated *Br melitensis* in a dilution 1/100—previously it had agglutinated in a dilution of 1/1 000. She received atabrin 0.30 gm and plasmoquine 0.02 gm on alternate days on four occasions. At the end of this treatment the spleen had disappeared below the costal arch; the fever had disappeared; and the serum no longer agglutinated *Br melitensis*.

The second case was of chronic malaria with a spleen similar in size to that of the first. Her blood harboured scanty *falciparum* parasites; her serum gave strongly positive B W Kahn and Meinicke reactions, though there was no history nor other signs of syphilis. She received two six alternate-day courses of treatment with atabrin and plasmoquine in similar doses to those given to the first case. At the end of the second course of treatment the spleen had regained its normal size; the B W and the Meinicke reactions were negative; the presumptive Hahn test alone giving a slightly positive reaction. N IV

GUPTA (S C Sen) Quinine Tolerance in Pregnancy—*Indian Med Gaz* 1937 Dec. Vol 72 No 12 p 740

A severe attack of *falciparum* malaria in a woman seven months pregnant necessitated the intramuscular injection of ten grains of quinine three times a day on three successive days. Recovery was rapid and two months later she gave birth to a healthy child. N IV

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 1938 Apr 23 Vol 110 No 17 p 1388 Quinine and Atabrine in Breast Milk. [Queries & Minor Notes]

The question of excretion of toxins in milk is of importance seeing that certain animal poisons—scorpion and snake venoms for example—may be present in sufficient amount to produce fatal results in a breast fed infant [J A WATERMAN *Trans Roy Soc Trop Med & Hyg* 1938 Vol 31 pp 607-624] and in countries where antimalaria drugs are habitually in use it is well to know if there are any risks to the child of a mother who is under treatment for malaria. The experiments of TERWILLIGER and HATCHER are referred to in this note: the



[July 1938]

authors gave to two women by mouth five doses each of 0.3 gm. of quinine sulphate and to four others seven doses of 0.64 gm. In all six traces of quinine could be found in the milk, in one as early as half an hour after administration. In none was it detected 24 hours after. In any case the amount present was too small to harm the nursing milk but it is of interest to note that in an article by KURT and HATCHER, on the Excretion of Drugs in Milk (*Amer J Dis Children* 1935 Vol 49 p 900) tests were made as regards morphine, codeine, salicylic acid, phenolphthalein, barbitol, sodium and potassium bromides. Of all these sodium bromide was the only drug found in amount sufficient to injure a normal breast fed infant.

H H S

FARJAUD (E) BALCILOVE (L) LATASTE (C) & NGUYEN VAN LIES  
Recherches préliminaires sur l'élimination de la quinine chez  
le malade paludéen. Preliminary Inquiry concerning the Elimina-  
tion of Quinacrine in Malaria Patients. — *Bull Soc Path Exot*  
1937 Vol 10 No 30 No 9 pp 791-799 With 3 figs

The observations recorded concern the day to-day elimination of quinacrine in the urine of three patients. The first was a chronic malaria sufferer who had been admitted to hospital for an appendicectomy; the second was an acute case of malaria with threatening pernicious symptoms; the third was a patient suffering from mental confusion as the result of too prolonged administration of quinacrine. The method employed was to transform the quinacrine salt present in the urine by the addition of potassium or sodium carbonate to saturation and then extract it with chloroform. The chloroform extract was compared with standard dilutions of the drug by means of a fluoroscope. The total urine passed in the 24 hours was used for these examinations.

After a five-day treatment with quinacrine the drug only appears in the urine in appreciable quantity after the lapse of a certain time, four days in the first case. Thereafter for four or five days, very considerable quantities are excreted. Then the amounts excreted become progressively less and less for about a month. This is followed by a varying period of residual elimination. A period of about 70 days is commonly required for the total elimination of quinacrine. A repetition of the treatment provokes an increase in the elimination of quinacrine in the urine both in quantity and duration. The latent period is shorter. It would seem that the organism is saturated with the drug for a considerable time after the first treatment. The total amount of quinacrine found in the urine is but a small proportion of the total dose administered.

V H

## VENOMS AND ANTIVENENES

SCHÖTTLER (W H A) Die Gifte von *Vipera latasti* und *V lebelina*  
 [The Venoms of *Vipera latasti* and *V lebelina*]—*Ztschr f Hyg u Infektionskr* 1938 Mar 19 Vol 120 No 4 pp 408-434  
 With 4 figs. [49 refs.]

This is a long and detailed account of the poisons of two species of viper and experiments carried out with them. The results of these experiments are set out in a series of 20 protocols which cannot satisfactorily be abstracted, though the conclusions can be presented —

1 *V latasti* emits the equivalent of 15 mgm. of dried venom on an average when biting *V lebelina* twice this amount.

2 The minimum lethal dose (M.L.D.) of the former is smaller than that of the latter being 0.02 mgm and 0.03 mgm respectively for a 10 gm mouse.

3 The certain lethal dose (C.L.D.) is the same for both namely 0.06 mgm

4 The active principle in each case is a powerful haemorrhagin. The anticoagulant action is much reduced by heating to 75°C and destroyed altogether at 100 C [the length of exposure to these temperatures necessary to produce these effects is not stated]

5 Both contain a very weak haemolysm the former rather more than the latter

6 *V latasti* venom contains a strong thermoresistant neurotoxin which is absent from *V lebelina*

7 *V latasti* venom produces a rapid fall in erythrocytes with leucocytosis and both venoms cause neutrophilic increase more in the case of the former persisting for 3 days with *lebelina* the increase is less and falls markedly again to considerably below the number before injection after 10 hours.

8 For treatment of a bite by *V latasti* one ampoule of 10 cc of anti-*ammodytes* serum (Milan) or the Paris antivenene ER or the Vienna European snake antivenene suffices for that by *V lebelina* at least two ampoules of the first are needed. H H S

CHIV (Keisho) Ueber den Einfluss gewisser Schlangengifte auf den Ca und K-Gehalt des Kaninchenserums sowie dessen Beziehungen zu den Tonusanomalien des vegetativen Nervensystems. I Studien ueber die Gifte formosanischer Crotalinae. [The Effect of Certain Formosan Snake Venoms on the Calcium and Potassium Content of Rabbit-Serum. I. Crotallines. II. Elapines.].—*Taiwan Igakkaï Zasshi* (Jl Med Assoc Formosa) 1938 Jan. Vol. 37 No 1 (394) [In Japanese pp 108-121 With 9 charts. [42 refs.] German summary pp 122-123] II Studien ueber die Gifte formosanischer Elapinae.—*Ibid* [In Japanese pp 124-131 With 6 charts. German summary pp 131-132.]

I Injection of the venoms of *C mucrosquamatus* *C gramineus* and *Ancistrodon* in doses of 0.01 mgm per kilo body weight of rabbits produced no change in the serum content of calcium or potassium. With doses of 0.1 mgm or over the K/Ca quotient is increased in each case

II *Naja naja atra* venom in doses of 0.002 mgm per kilo causes no change in the Ca or K content with 0.02 mgm a slight lowering more marked with 0.2 mgm The K/Ca quotient is unaltered with doses below 0.2 mgm above that it is slightly reduced

*Bungarus multicinctus* venom in doses of 0.0002 mgm. per kilo., produces slight fall but with 0.002 mgm. the K content falls, the Ca falls later after a preliminary rise and the K/Ca quotient presents a similar primary reduction and secondary rise  
H H S

CHOPRA (R. N.) & CHOWHAN (J. S.) Cobra Venom in Therapeutics.—*Indian Med Gaz.* 1937 June. Vol 72. No. 6. pp 339-348 [34 refs.]

This article not only summarizes well the general results of the large amount of work already done on the therapeutic uses of Indian snake venoms but gives details of over a score of cases illustrative of several groups. In introductory paragraphs the authors give a brief résumé of the action of cobra venom (a) on the tissues, (b) on the cardiovascular system, (c) on the nervous system. Next follows an epitomization of the literature dealing with the use of the venom in inflammatory conditions of the eye in neoplasms, and in cutaneous affections and leprosy. The venom employed in the authors' cases was prepared from the dried cobra venom which was dissolved in sterile physiological saline in a concentration of 1 in 10,000 passed through a Sertz filter and put up in 0.5 cc ampoules. The standard was one "mouse unit" i.e. the maximum dose which did not prove fatal to a 20 gm white mouse in 24 hours or less, when injected intramuscularly. This was ten times as large as that tolerated when injected into the dorsal tail vein. In the cases related the initial dose was 0.5 to 1.0 m.u. (mouse unit) injected twice weekly rising gradually according to the reaction produced, to 10 m.u. occasionally more.

The subjects treated during the past two years at the Calcutta School of Tropical Medicine and in the Carmichael Hospital are over a hundred and from these a selection has been made for record. These are divided into five groups: i. With vague symptoms associated with pain in various parts of the body (9). ii. Those suffering from the nerve type of leprosy (6). iii. Those with new growths (carcinoma of tongue or throat) (3). iv. Three patients sensitive to the venom. v. Two with pain and paraplegia. The results were relief of pain, improvement in general health and in appetite. Relief of tabes-like symptoms was marked and those with neuralgias or neuritis.

The authors agree with VACHT that the action is on the sensory nerve-endings, like that of opium and its alkaloids, but is of much longer duration. The analgesic properties are in the neurotoxic constituent of the venom. The haemolysis, haemorrhagins and other principles also have their effects on injection as the authors say in conclusion. "The separation of these active principles and a study of their pharmacological action may give us therapeutic remedies of importance" see also PRICK, S. M. ROSENTHAL, N. & EARL, L. v. KLONISZKY, D. this *Bulletin* 1937 Vol. 34 pp 645-663.

H H S

ROTHMANN (Alexander) Zur Therapie der sensiblen Reizsymptome bei Tabes dorsalis durch Kobratovm. [Cobra Venom in the Treatment of Tabetic Crises.—*Arch Woch* 1937 July 24 Vol. 16 No. 30. pp 1051-1056 With 1 chart [16 refs.]

The author after reviewing the therapeutic uses of cobra venom, gives short notes of ten cases of tabes from the Vienna University

Clinic treated by this means for relief of crises. The preparation employed was a venom [species not stated] of which ampoules of 5 cc. contained 200 mouse-units. He gave doses in most cases daily at the beginning increasing from 10 units to 25 or 30 then at longer intervals 7-10 days larger doses up to 60 units. He obtained as others have reported also good results and thinks it acts on the specific granulation process. He warns against interpreting coincident freedom from pain as consequent relief of pain and does not think the venom serviceable in conditions such as meralgia paraesthetica amputation neuralgia and herpes zoster. H H S

KORESSIOS (N T) L'action du venin de cobra total (non filtré) sur la température et l'état général des tuberculeux. [Results of Injection of Cobra Venom on Tuberculous Patients]—*Bruxelles Méd* 1937 June 27 Vol. 17 No 35 pp 1278-1284 With 8 charts

[Workers with snake venoms seem of late to have been engaged in obeying the injunction of trying all things—it is to be hoped that they will review their results critically to decide that which is good before they comply with the second part of the injunction. The venom has been reported as beneficial in haemorrhage in haemophilia in epilepsy in cancer in neuralgias in rheumatism in tabes and now the claim is made that it is good in tuberculosis.] The preparation used by the author was Cobranyl Meurice a solution of whole unfiltered venom injected in doses of 0.05 mgm at intervals of 3 to 7 days. To interpret the results three essentials are laid down (1) That the temperature curve should have been fairly constant for several days preceding the first injection (2) That the fall of temperature should follow at once after the injection (3) That the same principles should apply as regards weight—a preceding decrease and subsequent rise.

Fifteen cases have been treated with the venom the patients suffering from tuberculosis in different forms chronic pulmonary pleural peritoneal and intestinal. Notes are given of eight of them in whom the injections were succeeded by a fall in temperature of 1 to 2°C (though it remained intermittent) transient in three more lasting in five. The other seven retained their irregular oscillations. All those in an early stage of disease put on weight and showed improvement in their general state. The author suggests that the mode of action of the venom is primarily by furthering elimination of toxins accumulating in the tissues and secondarily by capillary vasodilatation induced by action on the metasympathetic. The number of cases and still smaller number which benefited are too few for drawing valid induction. H H S

KUJAWSKI (E) O veneno da cobra nos adenomas prostáticos [Cobra Venom in Cases of Prostatic Adenoma.]—*Acta Med* Rio de Janeiro 1938 Feb Vol. 1 No 2 p 175 [In Spanish & English]

Records of benefit following the use of snake venom in malignant growths led the author to test the same remedy on benign tumours and for a first trial he employed it in four patients with adenoma of the prostate. Fuller details are promised for subsequent publication.

this is merely a preliminary note and one case only is mentioned—a man of 68 years with severe urinary obstruction and a residuum of 600 cc. Nine injections were given [dosage and frequency will probably be stated in the fuller account] and the improvement is said to have been such that the second stage of the operation was not deemed necessary. In all four patients the dysuria, incontinence and nocturnal micturition disappeared.

H H S

GRASSET (E) & ZOUTENDYK (A) Studies on the Gaboon Viper (*Bitis gabonica*) and the Preparation of a Specific Therapeutic Antivenene.  
—*Trans Roy Soc Trop Med & Hyg* 1938 Jan. 25 Vol 31  
No 4 pp 445-450 With 8 figs

The authors have shown that polyvalent antivenene prepared from the venoms of the puff adder (*Bitis arietans*) and the Cape cobra (*Naja ferox*) are practically ineffectual against the venom of the Gaboon viper (*Bitis gabonica*) a common snake in equatorial Africa [see this *Bulletin* 1936 Vol 33 p 383]. As there is no available antivenene workers have been a little shy in experimenting with it and the authors were able to obtain only a limited supply. The average yield of a snake is 200 mgm when the product is dried but as much as 484 mgm has been obtained. The venom is less toxic than that of the puff adder as the following table demonstrates.

*Toxicity of the venom of Bitis gabonica compared with Bitis arietans venom.*

	Route	Venom in mg	
		<i>Bitis gabonica</i>	<i>Bitis arietans</i>
Mouse	Subcutaneous	0.4	0.15
Rat		3	1.5
Guinea pig (500 grammes)		75	50
Rabbit (1,500 grammes)	Intravenous	3.2	1
Pigeon		0.075	0.075
	Subcutaneous	2.5	2
Fowl	Intravenous	0.6	1.5
Sheep	Subcutaneous	80	50

*Note*—In a paper dealing with the toxic and antigenic properties of snake venoms (GRASSET, ZOUTENDYK and SCHAAFMA, 1935) the fatal dose of *Bitis arietans* venom for the pigeon appeared as 0.75 mg. this should read 0.075 mg. as in the present table.

Atoxic derivatives analogous to those previously obtained from *Bitis arietans* were prepared by subjecting 1 per cent solutions of the venom in Martin's broth to 0.75 per cent formalin at 37°C. for three weeks. With this a horse is injected subcutaneously at weekly intervals with doses increasing from 50 mgm to 700 mgm. [More would have been given but the supply was exhausted.] The serum was tested during the process on rabbits and after the fifth injection (400 mgm) death was delayed to 16 hours in rabbits injected with 7.5 mgm venom and 3 cc. serum after the seventh injection (600 mgm) the use of serum was followed by survival of the animals which presented no ill-effects. Test of the serum ten days after the last injection

showed that 3 cc. would neutralize 10 mgm. that is 1 cc would neutralize approximately 1 m.l.d. for a rabbit of 2 000 gm

Concentration by fractional precipitation with sodium sulphate produced a strength of pseudoglobulin of which 0.45 cc. would neutralize 5 mgm. venom that is the concentrated serum was 3.3 times as potent as the original product One cc. of this finished product diluted with distilled water for use neutralizes 7 mgm of the venom and 20 cc ( $\approx$  140 mgm venom) is the dose recommended. For travellers in equatorial Africa this should be carried either as a monovalent serum or incorporated in the generally used polyvalent preparation [see this *Bulletin* 1937 Vol 34 p 722] H H S

VALLE (Sergio) O anaveneno crotalico em ophtalmologia [Snake Venom in Ophthalmology]—*Rev Brasileira Leprologia* S Paulo 1937 Dec Vol 5 No 4 pp 481-500 With 1 fig [14 refs.] English summary [10 lines.]

The author touches upon the uses of snake venom for treatment of painful conditions such as neuralgias of leprosy cancer and tabetic crises and goes on to record benefit from conjunctival and retrobulbar instillation (0.5 cc. of *Crotalus anavenene* with 1.5 cc. physiological saline) the number of drops depending on the intensity of the pain It acts on the ciliary nerves and on the peripheral endings of them blocking all ocular sensitivity He finds it valuable in ocular pain whether of leprotic or other origin giving immediate and lasting relief without causing any disturbance local or general. H H S

LOWENSTEIN (Wilfried) Die Verwendung von Schlangengift und ähnlich wirkenden Pflanzengiften in der Therapie [Employment of Snake Venoms and Plant Poisons with Similar Action.]—*Wien. Klin Woch.* 1938 Mar 11 Vol. 51 No 10 pp 302-306

SAJIDIMAN Mededeelingen over slangenbeten [Snake Bites.]—*Med Berichten* Semarang 1937 Jan & Mar Vol 1 Nos. 4 & 5 pp 50-54 69-73

The author draws attention to the few records of cases of snake bite in Java. In the present communication the history of a case of bite in the heel by *Bungarus fasciatus* is given fully day by day The chief features of the case were the occurrence of haemorrhage in all parts of the body and its appearance in urine and faeces delay in coagulation time prolongation of bleeding time severe thrombocytopenia increased sedimentation rate and great tendency to oedema Treatment of snake bite is in the first place a serum treatment and intravenously if the symptoms are serious. The patient in question showed continuous bleeding not only from the bite but also from injection sites Consequently vitamin C in the form of Redoxon was injected on the grounds that it possesses styptic properties promotes an increase in thrombocytes and probably also of the serum albumin. The rapid increase of thrombocytes was striking When the patient had recovered except for persistence of an infiltration of the left calf and some local pain he could not be kept in hospital any longer

W F Harvey

BIGGI (Pietro) Un caso di grave avvelenamento da vipera curato a cinque ore di distanza con iniezione endovenosa di siero anti-vipera [Viper-bite treated with Antivenene Intravenously]—*Terapia* Milan 1937 Apr Vol. 27 No. 214 pp. 106-110

A woman of 30 years was bitten on the right foot by a viper (not specified). She was not seen by the author till five hours later when she was collapsed, delirious with severe headache nausea and obstinate vomiting, marked dyspnoea small rapid pulse. In view of the grave condition she was given the contents of a phial (quantity not stated) of anti-viper serum I.S.M. The results were dramatic. In ten minutes she was calmer and recognized those around her and in a quarter of an hour the pulse was normal and dyspnoea subsided. Though she was much better a second injection was given the following day and convalescence was uninterrupted.

H H S

BAVIĆ (M) & LJUNZRIĆ (T) Die Titration eines Serums gegen Schlangengift an Mäusen (Serum antivipera ammodytes) [Titration of 1 ammodytes Antivenene in Mice.]—*Ztschr f Hyg u Infektionskr* 1938 Mar 19 Vol. 120 No 4 pp. 360-407 With 1 fig [12 refs.]

## MEDICAL AND SANITARY REPORTS

## NYASALAND PROTECTORATE (1936)

Nyasaland Protectorate consists of a strip of land about 520 miles long by 50 to 100 miles broad lying to the west and south of Lake Nyasa. Its neighbours are Northern Rhodesia to the west, Tanganyika to the north and north-east and Portuguese East Africa to the south. Its total area is approximately 37 596 sq miles of land and 10,353 sq miles of water and its chief towns are Blantyre, Limbe and Zomba (the headquarters of the Government).

*Vital Statistics*—Under this heading Dr A. D. J. BEDWARD WILLIAMS, Director of Medical Services, observes: "It is difficult if not impossible to assess the effectiveness of the work of the Medical Department in regard to the general health of the population except by reference to its vital statistics. Records of births and deaths have been maintained in the Fort Manning District since May 1933 and excellent work has been accomplished. In 1935 similar efforts were applied to the Karonga District but unfortunately the work had to be curtailed owing to shortage of medical staff. Another important medico-statistical enterprise implemented in Nyasaland takes the form of *Medical Surveys* and a considerable mass of most valuable information has been assembled as a result of these commendable enquiries. (These matters were mentioned in this *Bulletin* 1936 Supp. pp 58\*-59\* and 1937 Supp. pp 63\*-64\*) Extracts are given from Medical Officers' Reports concerning the results of three Surveys and in one case relating to the Survey of the West Nyasa District a particularly interesting and full account is contributed by Dr D. P. TURNER, Medical Officer of the area. Of the Medical Surveys Dr BEDWARD WILLIAMS says: "Medical surveys, it is true, give a clear indication of the extent of invalidity, but the scope of medical surveys is necessarily small and affects only a minute proportion of the population in any one year. These accounts should be read in their entirety, since limits of space prohibit anything more than brief mention of these really admirable enterprises in these pages."

The available facts relating to Nyasaland as a whole read as follows:—

Race	Population	Births	Deaths
Europeans and Whites	1,838	35	18
Africans	1 619,530	Not known	Not known
Asiatics	1,558	71	18

The following data relate to the Fort Manning District (see above):

Population (approximate)	35,000
Births	7,932
Birth rate	46.8 per 1 000 population
Deaths	3 439
Death rate	21.8 per 1 000 population
Infant Mortality Rate	82.3 per 1 000 live births

European Officials resident numbered 269 with an average number resident of 206. Four were invalided and one died. Native Officials (including Native Troops and Police) numbered 2,603, nine died during the year.



*Maternity and Child Welfare Work* — Progress was seriously hampered chiefly owing to financial stringency. Only 104 confinement cases were dealt with at Government Hospitals and of the total only 28 were normal labours. As no women Medical Officers are employed by Government and no European nurses at any Government African Hospital with the sole exception of Zomba, it is difficult to persuade pregnant native women to attend treatment centres to provide necessary treatment for the babies or young children or even to make provision for the training of native girls and women as midwives and welfare workers. The maternity and infant welfare centres established in 1935 in the African Hospital, Zomba (see this *Bulletin* 1937 Supp. p. 62\*) and at the Jeanes School are the only Government places where an active interest is taken in the welfare of women and children. With aid from the Colonial Development Fund three welfare clinics and three houses for health-sisters were erected, but lack of financial assistance from Government funds made it impossible to make full use of the buildings. Facilities for training and increases in the European nursing and health staffs are urgently needed.

Dr Turner supplies a series of facts relating to mothers and infants in the West Nyasa District (see Medical Surveys above). His records show for 472 mothers 1,952 births or an average per woman of 4.6 of the total children born 997 were living at the time of the survey. Miscarriages are said to be very common and the taking of abortifacients a usual practice.

*Medical Missions* continued to carry out useful work at the three maternity and infant clinics subsidized by Government at these centres some training of native midwives is undertaken. The Blantyre Mission Hospital is to receive a Government grant-in-aid to further the training of midwives.

The record of the year's work at various centres may be set out in the following manner —

Centre	Maternity Cases	Maternal Deaths	Infants on Registers	Infant Deaths
African Hospital Zomba	11	2	219	—
Mlanda Mission	63	1	417	42
Blantyre	150	11	240	210
Bandawo	23	—	65	—
Jeanes School	13	—	—	—

*School Hygiene* — Owing to unusually high incidence of sickness among the qualified medical personnel the programme of work had to be curtailed. The three European schools were inspected and 27 boys and 40 girls examined. Improvement in the dental condition of the Blantyre and Limbe pupils was recorded. In Zomba 90 per cent. of the children showed enlarged or unhealthy tonsils. The pupils attending three other schools were examined, results being set out in some detail these included —

(a) *The Providence Girls School Mlanje* where 83 pupils were examined. Data are presented relating to ages, heights, weights, blood films positive for malarial parasites, with percentages for each type of infection, stools positive for hookworm, urines positive for *S. haematobium*, palpable spleens etc.

(b) *Kota Kola School* where 111 girls were examined results are given of blood examinations for the presence of malaria parasites stools and urines and spleen examinations.

(c) *The Catholic Institute Blantyre* 58 pupils examined conditions described as regards nutrition skin diseases teeth tonsils blood and urine examinations.

In his Report of the Survey of the West Nyasa District Dr Turner (see *Medical Surveys* above) tabulates the results of his examinations of 707 children ranging from 0-10 years of age various abnormalities are recorded in absolute numbers and in percentages.

*Public Health Sanitation etc*—Fortunately no serious epidemic outbreaks menaced the health of the people during 1936 during which year considerable departmental reorganization was in progress In the Districts while curative medicine was well maintained emphasis was laid upon the importance of preventive health measures medical officers were encouraged to visit rural dispensaries frequently and to devote as much time as possible to the training of their native assistants.

Despite a continued paucity of funds a marked improvement in the sanitary condition of certain villages is reported. This is especially true of the Fort Manning District where many villages have been reconstructed water-supplies improved and where itinerant inspectors maintain registers of births and deaths The aim of the Medical Department is to develop health units centred on rural dispensaries as funds and staffs allow from time to time As evidencing the progress made in general sanitation in the face of stupendous difficulties the following extracts from various sections of the Report and relating to different areas may be cited —

35 villages have been partially or completely reconstructed and sanitated.

the completion of 470 latrines in one part of the district and of 40 in another

latrination of the district is proceeding steadily

it is now the usual thing to find every hut with its own latrine.

*Water supplies* are scarcely mentioned (see this *Bulletin* 1937 Supp p 65\*) Of one area it is said the only source of water supply is from holes dug by the natives alongside swamps Endeavours are being made to improve these conditions.

*Labour conditions* received considered attention. With the permission of employers of labour medical officers visited estates and proffered advice with regard to general sanitation housing etc their suggestions were welcomed by the majority of estate owners. The conditions observed on four estates employing an aggregate of about 4,500 labourers are tabulated as regards housing latrine accommodation water supplies food medical facilities. During the year 1 579 natives were medically examined for mining work in South Africa or in Southern Rhodesia The number of emigrants proceeding independently in search of work to other territories is not known but in 1935 it was estimated that about 120 000 Nyasaland natives were abroad (see this *Bulletin* 1937 Supp p 65\*) A number of repatriated Nyasaland natives return each year during the year under review 1 472 returned from South Africa and a number from Southern Rhodesia all are medically examined on arrival in the territory.

*Housing and Town Planning* matters in the Protectorate are dealt with by a Central Town Planning Committee. In Zomba, Blantyre, and Limbe progress is reported in the establishment of model villages for the accommodation of natives. As regards *food in relation to health and disease* the adequacy or otherwise of native diets native methods of agriculture etc. are among matters under investigation. Interesting facts relating to native diets have been assembled by medical officers during the course of their Medical Surveys. Dr H. G. FITZMAURICE contributes a particularly interesting and detailed account of native foodstuffs and diets in the Kota Kota District.

Reports by district medical officers and sub-assistant surgeons describe *measures taken to spread the knowledge of hygiene and sanitation* these follow along lines previously described (see this *Bulletin* 1937 Supp. p. 65\*)

*Recommendations*—Dr Bedward Williams observes that since no great increase of funds or staff is likely to be forthcoming in the immediate future the problem facing the authorities is to devise an organisation capable of effecting the greatest amount of good with the limited budgetary allowances available. In these circumstances the training of African personnel is of first rate importance for native assistants better educated trained to diagnose and treat minor ailments and capable of taking charge of general hygiene and sanitation work in rural areas are urgently needed. Steps have already been taken to this end but the scheme of training demands for its efficient implementation additional European instructors. The extension of maternity and child welfare work is especially emphasized, and for the training of native midwives the appointment of a qualified female medical practitioner is considered necessary. Other requirements envisage the erection of a new European Hospital an up-to-date and well equipped laboratory and the appointment of a qualified European laboratory assistant.

The scheme of *training African Personnel* provides for the training of native female nurses native male dispensers and dressers laboratory assistants etc. Candidates are required to have reached a prescribed educational standard before they are admitted to take the courses extending over fifteen months. At the Jeanes School Centre a number of welfare and community workers have commenced a two years course of instruction along lines suggested by the Medical Department.

[*Special Note*—The Medical Surveys frequently mentioned in these notes are a characteristic feature of public health work in Nyasaland and as such are worthy of special consideration. Results achieved by Medical Officers conducting these small-scale enquiries are excellent in every way and since it is quite impossible in these pages to do ample justice to reports of work accomplished in the course of these investigations readers are recommended to turn to the descriptions supplied and read them in their entirety (see also this *Bulletin* 1937 Supp. pp. 63\*-64\*)]

*Port Health Work*—A quarantine camp is established at Port Herald (on the Lower Shire River on the main railway line Beira to Blantyre and about 113 miles from Blantyre). At this centre Asiatics and natives entering Nyasaland and who may have been in contact with infectious diseases, or unable to produce vaccination certificates, are dealt with. During the year 45 natives only were examined at this station.

*Hospitals Dispensaries etc*—Except that from time to time small additions improvements etc. have been made to the European Hospitals there is nothing of moment to report (see this *Bulletin* 1936 Supp p 61\* and 1937 Supp p 68\*) At these institutions 165 persons received treatment as in patients and 1 685 as out patients 3 hospital deaths were recorded *Malaria dysentery diseases of the digestive system* continue to be among the principal ailments treated.

As regards the *Native Hospitals* the most noteworthy feature is the increase in female patients. This is particularly noticeable in the Zomba area where there are two European sisters and where the female wards are staffed with African females the returns show a 31 per cent. increase of female patients over the 1935 records. *In-patients* treated at all native hospitals numbered 9 757 with 250 deaths hospital out patients numbered 133 751 and cases treated at the 93 *Rural Dispensaries* 301 738 *Diseases of the skin digestive system respiratory affections malaria venereal diseases and helminthic diseases* were among the principal causes of ill health recorded.

The usual grants-in-aid were made to Mission Hospitals for the treatment of natives sent to them by Government

From the references to general morbidity experience in the text of the Report the following summaries have been compiled —

*Malaria* cases reported from hospitals and rural dispensaries are stated to have totalled 16 002 distributed as to 177 Europeans and 15,825 Asiatics and Africans Actual hospital returns however give the following details —

Type of Infection.	Europeans		Asiatic and Africans		Rural Dispensary Out patients
	In patients	Out-patients	In patients	Out-patients	
Benign tertian	3	12	32	301	—
Quartan	0	7	29	135	—
Subtertian	7	32	356	903	—
Cachexia	1	3	28	63	—
Undefined	12	123	353	4 650	10 773
Totals	23	177	796	6 052	10 773

By this showing it would appear that 17,821 malaria patients were treated Eleven deaths among Asiatics and Africans were ascribed to the disease. Of *Blackwater fever* 14 cases with 3 deaths were recorded.

The chief vectors of malaria in Nyasaland are *A gambiae* and *A funestus* The disease is hyperendemic over the whole territory with seasonal variations. In rural areas the efforts of the Medical Department have but little effect in reducing incidence but in the townships where anti malarial works are effectively carried out a fairly satisfactory state of affairs is said to exist (see also this *Bulletin* 1937 Supp p 67\*)

At the Government Laboratory Zomba out of the 3,229 blood films examined 1 098 were positive for malaria parasites with the following findings—*P falciparum* 796 *P malariae* 230 *P vivax* 39 mixed infections 29 and undefined 4

The epidemic of smallpox which has raged with diminishing force during the past seven years has almost completely died out—183 non-fatal cases only were reported. Vaccinations performed during the year totalled 236 085. Eleven cases of cerebrospinal fever were treated in native hospitals with 4 deaths. It is stated that an unknown number of cases also occurred in the districts where spasmodic outbreaks are reported from time to time but the infection does not appear to spread.

Hospital Returns show 2,545 cases of influenza with one death, 538 of relapsing fever with one death, 2 of acute poliomyelitis and one European case of typhus. Rabies of which 6 cases were recorded, continued to be a source of unrest throughout the Protectorate. Numbers of persons who had been exposed to infection took advantage of anti-rabic treatment.

Measles is said to be widespread throughout the territory. During the year 1 191 cases of measles and German measles were reported.

Enteric fever.—The Report observes "Six cases occurred amongst Europeans and one case was reported amongst the native population." On turning to the Hospital Returns the reader finds 3 European in-patients, 3 European out-patients, 6 African in-patients and one out-patient. Laboratory findings showed 4 positive agglutinations (out of 99 tests made) 3 with *Bact. typhosum*, 1 *Bact. paratyphosum A*. As regards dysentery the Report states: "The total number of cases reported was 1 429" but Hospital Returns show that 1 708 in- and out-patients were treated, of the total 363 were amoebic, 71 bacillary and in 1 174 cases the type of infection was not defined. Out of over 6,000 stools of Africans examined for intestinal parasites 3.7 per cent. were positive for *E. histolytica*.

Of tuberculosis it is said 246 cases of all forms of the disease were reported. In-patients and out-patients treated at Government institutions total 410 and of these 205 were suffering from the primary form of the disease. In the opinion of most medical officers the incidence of the disease is increasing. It is noted that during the period 1932-38 among the 611 repatriated Nyasaland natives from Southern Rhodesia 64 or 10.4 per cent. were suffering from tuberculosis. The spread of the disease may be influenced by this factor of repatriated labourers, for it is not known how many such natives return each year from neighbouring territories and from South Africa. The control of the disease in these circumstances is difficult: efforts are being directed towards localizing all infected persons.

Six cases of trypanosomiasis were reported. The Medical Entomologist Dr W. A. LAMBORN carried out examinations of the excreta of *G. morsitans* with a view to the further study of the flagellates sometimes passed by the fly. Flies known to be infected were also fed to certain animals and the blood of the latter examined from time to time. No positive results attended these experiments.

Helminthiasis.—A year ago the findings of the Medical Surveys were referred to in these pages (see this Bulletin 1937 Supp. pp. 63-64) and the percentages of persons infected with hookworm and schistosomiasis, etc. recorded. It is said that in the Mlanje area 22.7 per cent. of all cases of illness treated in the native hospital were due to infection by either hookworm or bilharzia. The following details extracted from the Report under review indicate the incidence of these infections:—

Institution	No. Examined	Percentage infected with—		
		Hookworm	<i>S. mansoni</i>	<i>S. haematobium</i>
Providence Girls School Mlanje	304	11.0	0.6	28.0
Boys School Karonga	260	25.3	18.0	55.0
Girls School Kota Kota	111	48.0	16.2	77.5
Catholic Institute, Blantyre	58	72.0	?	48.0
Central Prison Zomba	300	37.0	?	12.7

Hospital Returns show that in and out patients treated for *ankylostomiasis* totalled 12 763 for *schistosomiasis* 7 122, for *ascariasis* 833 and for *taeniasis* 34 (Little meat is eaten but when available is well-cooked) Of the total cases recorded only 4 occurred among Europeans At the Laboratory where over 8 000 stool specimens of Africans were examined 31.6 per cent were positive for hookworm 2.3 per cent *S. mansoni* 0.1 per cent *S. haematobium* 2.7 per cent *ascaris* Other faecal specimens to the number of 1 482 were examined and among the 586 positive findings 70.8 per cent were hookworm 4.3 per cent *S. mansoni* 0.2 per cent *S. haematobium* and 3.9 per cent *ascaris*

*Venereal Diseases*—Clinics are established at Blantyre and at Zomba but difficulty is experienced in persuading patients to attend for treatment to cure. During the year 4,244 cases were treated at hospitals and dispensaries only eleven of these at European hospitals. The distribution of cases was *syphilis* 3 134 *gonorrhoea* and its complications 1 101 and *soft chancre* 9 Many women in rural areas are said to suffer from venereal diseases but in the absence of native nurses or lady medical officers they are reluctant to seek treatment Of the 4 472 cases of *yaws* treated during the year 2,862 were dealt with at Rural Dispensaries.

*Leprosy*—Government provides financial assistance to the 12 clinics maintained by *Missions* grants are made in proportion to the number of cases treated. At these centres during the year 182 patients were admitted 646 were treated as in patients 19 died, and 58 were treated as out patients. In addition 46 lepers received in patient treatment at Government Hospitals and 139 as out-patients at hospitals and dispensaries. No exact information as regards the numbers of lepers in the territory is available but observers are of the opinion the disease is increasing

*Deficiency diseases* are the subject of a special note During the year 43 cases of *pellagra* and 56 of *scurvy* were treated at various Government institutions. All the *scurvy* cases were reported from one district by a rural dispenser but later enquiries failed to reveal any conditions which would confirm the diagnosis and it was concluded reports of these cases were inaccurate.

Four Special Reports are included as Appendices to the Annual Report under review they are as follows —

(1) Dr H. G. Fitzmaurice with *Observations on the Native Foodstuffs and Diet in the Kola Kola District* This contribution describes in considerable detail foodstuffs available methods of preparation amounts eaten daily etc. Anthropometric data relating to eleven illiterate schoolgirls are supplied. (2) Dr H. D. Cronyn's contribution

is entitled *Spinal Anaesthesia with Special Reference to its uses in Nyasaland*. The advantages of spinal anaesthesia over inhalation anaesthetics are discussed. technique employed is described. In a series of 50 operations, 2 deaths occurred neither attributable to the anaesthetic. (3) Dr W. H. Watson describes three "Interesting Cases" (a) A case of *Gumma of the Cerebellum*, (b) *Coronary Obstruction simulating Thrombosis* and (c) a case of *Tabes Dorsalis*. (4) Dr D. P. Turner submits his *Report of a Survey of the West Nyasa District*. This exceptionally interesting and comprehensive study was briefly referred to in the section 'Maternity and Child Welfare' above.

**Scientific**—Dr W. A. Lamborn, Medical Entomologist, made a tsetse fly survey in the Northern Province. he concludes that the recession of the fly from the Dowa and Fort Manning Districts has been maintained (see this *Bulletin* 1937 Supp. p. 69\*). Other surveys were directed to the discovery of the breeding places of the domestic species of flies in Zomba and Fort Johnston and for mosquitoes of the *Aedes* group and their near allies in the neighbourhood of the Chileka and Zomba aerodromes. In addition to sleeping sickness studies (see *Trypanosomiasis* above) other research investigations included work concerned with the transmission to man of *Treponema pertenue* by the fly *Musca sorbens* and the problem of the transmission of leprosy through the agency of the haematophagous fly *Musca sorbens* and the bug *Cimex* species. During the year Dr Lamborn published the following papers—

A possible Reservoir Host of *Trypanosoma Rhodesiense*—*Brit Med Jour* 6th June, 1936

The Experimental Transmission to Man of *Treponema pertenue* by the Fly *Musca Sorbens* Weid.—*Jour of Trop Med. and Hygiene* 15th October 1936.

The Report of the Government Pathologist Dr H. M. SHELLEY records that over 8100 specimens were received and examined. these included 3,229 blood films, 1,482 faecal specimens, 1,143 urines, etc. (Findings briefly recorded under *malaria enteric fever helminthiasis* in these notes) *Witcham-Georgi* test for syphilis proves *co* of correspondence with clinical *st*al of 372 proving positive. One *is* of blood from adult Africans *and* three types determined. 144 members of four Nyasaland *tribes* tabulated.

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statistics of any value are available for the registration of vital facts is not generally observed. The system of notifying deaths to the medical authorities in Berbera and six other townships has failed to achieve its objects for deaths are not reported and burials take place without examination. Efforts are being made to devise an efficient system. Mortality data relating to the seven townships are omitted from the Report under review.

*European Officials* resident numbered 77 with an average number resident of 43. Two were invalided and one death was recorded. It may be noted that Government Officials and their families constitute the entire European population of the Protectorate. 37 non-official Europeans visited the country for business or pleasure during the year. *Asiatic Officials* resident numbered 68 with an average number resident of 56. One was invalided but no deaths were recorded within this group.

The following data relate to Troops and Police —

Item	Number on strength	Average number on strength	Invalidings	Deaths	Remarks.
Troops S.C.C. (K.A.R.)	392	337	11 <sup>1</sup>	4 <sup>1</sup>	<sup>1</sup> Relapsing fever 1 unfit 11 <sup>2</sup> Pneumonia 2 Suicide Entertus each 1
Police	788 (includes 192 special and temporary Police)	694	11 <sup>1</sup>	4 <sup>2</sup>	<sup>1</sup> Pulmonary tuber- culosis accounted for 6 <sup>2</sup> Pneumonia 2, dia- betes and anaemia each 1

*Maternity and Child Welfare Work*—A few normal and abnormal labour cases are treated in the hospitals but there is no routine ante-natal work done nor can anything be attempted in this direction without the appointment of a qualified woman worker (see this *Bulletin* 1937 Supp. p. 76\*).

*School Hygiene*—There are no English schools and the proposed station schools under European supervision (see this *Bulletin* 1937 Supp. p. 76\*) are not yet established. Little can be done at present as regards routine inspection or instruction in the elements of hygiene.

*Public Health Sanitation etc*—No major epidemics occurred during the year under review. It was also a good pasture year and the effect of this in the words of the Report automatically reduces the average numbers of those dwelling in the larger townships and lessens the incidence of diseases due primarily to dietetic deprivation.

As regards general hygiene and sanitation it is stated that Berbera is the only township having a *water carriage system* with sewage disposal to individual septic tanks and even this system applies only to European quarters and specified institutions. In other townships disposal is by the *bucket system* for European and Asiatic Government quarters while Indians, Arabs and better-class Somalis living in permanent buildings usually have *pit-latrines* in the compounds of their houses. The bulk of the native population defaecate in the open



outside demarcated boundaries. In Berbera and certain other townships sanitation is under the control of the District Officer medical officers assisting with technical advice and routine inspections the system is necessitated by shortage of medical officers but is not wholly satisfactory. The single Asiatic Sanitary Inspector stationed in Berbera controls the sweepers who endeavour to maintain a superficial cleanliness of the town.

Berbera is provided with piped water supplies (see this *Bulletin* 1933 p 70\* Supp.) but the water though bacteriologically pure is scarcely potable by reason of its salinity permanent hardness, unpalatable taste and laxative action. European residents either install their own water softeners or obtain fresh drinking water from a source 25 miles distant. Pumped supplies have been installed at Sheikh Burao and Hargeisa.

The general conditions of housing have been summarized in previous issues of this Supplement (see this *Bulletin* 1933 Supp. p 70\*). The medical department exercises very little control over the siting and erection of new buildings, but attention is always paid to matters affecting individual or public health.

As regards food it is stated the native appears to be showing a more general tendency towards the consumption of such vegetables as onions. Diseases directly attributable to food contamination are said to be uncommon. The ever present danger of undulant fever is emphasized, the issue of goats milk to Government institutions discouraged and consumers advised to ensure careful boiling of the milk before use.

*Hospitals Dispensaries etc.*—It is stated that established hospitals are in the main adequate for the purposes they serve though some are in bad state of repair and new premises will have to be provided in the near future. The record of work at these centres of treatment reads as follows:—

Hospital	In-patient	Hospital Deaths	Out-patients
Berbera	645	15	13,978
Borama	368	3	5,137
Burao	852	19	10,304
Erura o	158	3	4,370
Hargeisa	590	15	8,815
Sheikh	23	1	2,519
Zeilah	76	1	4,026
Totals	2,844	57	49,147

As compared with the records of the preceding year a small decrease in the numbers of in-patients but a slight increase in out-patient cases is noticeable. In this connexion it may be noted that in the early part of 1936 a small charge was imposed for in-patient treatments this was not altogether popular and may have had the effect of encouraging out patient attendances. On the other hand 1936 was a comparatively healthy year free from major epidemics and the fall in the numbers of in-patients may be held to reflect in part at least the better conditions of living prevailing during the year under review.

Hospital figures however can only tell part of the story for the great medical problem in Somaliland is how to reach the nomadic people in distant grazing areas. It is suggested the solution might be found in the establishment of mobile dressing stations staffed by properly trained natives.

The notes which follow briefly summarize the principal diseases dealt with during the year and commented upon in the pages of the Report under review —

*Malaria* cases were considerably fewer 677 as compared with 1 151 during the preceding year. Of the total cases 560 were treated as in patients types of infection being distributed as to *P vivax* 90 *P malariae* 64 *P falciparum* 396 and 10 malarial cachexia. 3 deaths were ascribed to malaria. Though the disease did not assume serious epidemic proportions in any part of the Protectorate it is endemic in many areas the recorded figures are no reliable indication of the prevalence of the disease for only a small proportion of those infected are able to travel the long distances from their homes to hospital centres. Of these people it is added they have not learned that quinine will cure the disease much more effectively than the prayers of a Mullah or a Koranic amulet strung round the neck. The usual routine measures concerned with the oiling of wells and standing water drainage etc. were actively continued. At the Laboratory where 4,366 blood films were examined 76 were positive for *P vivax* 100 for *P malariae* and 442 for *P falciparum*.

*Relapsing fever* appears to show a steady increase in the numbers of cases. During 1936 persons treated for the disease numbered 902 as compared with 843 in 1935 of the total 309 were in patients and one died. In a special Appendix to the Annual Report Dr E. M. CLARK contributes a special survey of the disease in some detail. It is stated that relapsing fever was introduced from Abyssinia and from 1916 continued to spread across the Protectorate. The town of Burao shows a particularly unenviable experience with a rapid increase from a single case in 1927 to 618 in 1936 with a further increase expected in 1937 unless special steps are taken to combat the disease. According to Dr Clark only about 50 per cent of patients receive hospital treatment among these the disease is mild in type with a mortality of about 0.6 per cent. Among untreated cases mortality is probably higher and in the opinion of Dr Clark from 50-100 persons die from this disease in Burao each year. One curious feature of incidence is that the numbers of cases are greatest between April and September each year when the population of the town is at its lowest level. Control could be made effective by the provision of well built brick buildings with plaster walls concrete floors and good roofs, but without considerable expenditure it is difficult to know how the problem is to be solved. Meanwhile improvements have been effected by tick proofing some of the houses in Burao.

*Smallpox* was prevalent mainly in the Burao district and to a lesser extent in Barama the disease which was of a mild type made its appearance during the early months of the year but no case occurred after September in any district. Hospital records refer to 156 in patient cases with 7 deaths. The outbreak was controlled by energetic vaccination and segregation 8,337 vaccinations being performed. The practice is observed of vaccinating all people from the interior before allowing them to enter the larger townships.

*Girls Grammar School*—Out of 188 pupils examined 102 had carious teeth and 84 enlarged tonsils in several cases accompanied by enlarged cervical glands. Throat swabs taken at random revealed one positive for diphtheria and several yielded growths of the non-haemolytic streptococcus, staphylococcus aureus and streptococcus viridans. At the *Boys Grammar School* where 103 pupils were examined, 39 had carious teeth 38 enlarged tonsils 17 cases showing enlarged cervical glands. Throat swabs revealed no diphtheritic condition. At *Queen Victoria School* 56 pupils were examined 22 had carious teeth, inoculation against typhoid was carried out and stools were examined. At the *Boys Grammar School* and *Queen Victoria School* epidemics of mumps occurred. The question of diet for European and other children in Fiji is to be investigated.

*Public Health Sanitation etc*—From the public health point of view the year was not a good one the death rate being the highest for some years past. During 1938 new Public Health Regulations were drafted with the object of condensing and simplifying the numerous existing Bye-Laws and Regulations. It is hoped these new Regulations will receive the approval of Government and soon become law. the new sanitary code if energetically applied should ensure considerable improvement in existing sanitary conditions. In view of the importance and recent development of the gold-mining industry and the necessity to safeguard the health of those engaged in the Fiji mines *silicosis* was added to the list of compulsorily notifiable diseases during the year.

As regards general *hygiene and sanitation* in the Colony the Report confines attention to activities in the Suva Rural Sanitary District. As regards *sewage disposal* in that area it is noted that the 2 445 recorded buildings (of which 2,350 are private dwellings) 2,064 are served by cement slab latrines and 218 by septic tanks only 9 are unprovided with adequate sanitary conveniences. The *Suva Garbage Disposal Bye-Laws 1936* effectively control the disposal of refuse etc in the Urban Sanitary District. Of the 2 445 buildings in the rural district 878 have piped water supplies 420 have tank supplies 215 depend on river water 768 are served by protected and 168 by unprotected wells. It is proposed to install a chlorinated and filtered pipe-borne water supply system throughout the Suva Rewa area.

Systematic house-to-house inspections and re-inspections continued to be made by the sanitary staff throughout the year and various sanitary improvements insisted upon. Fiji continues to be a non-malarial country and the authorities take the most stringent precautions to prevent the introduction of anopheline mosquitoes.

The *Town Planning and Building Regulations* are gradually improving the appearance of the business area. Dwelling-houses must be erected in accordance with the requirements of the Building Bye-Laws. A complete survey of Suva is to be carried out so that a comprehensive town planning scheme might be formulated.

*Port Health Work*—The usual routine duties continued to be carried out as previously described (see this *Bulletin* 1937 Supp. p. 212). During the year 147 incoming vessels were boarded and 3 785 passengers and 2,602 members of crews were medically inspected. In December all the 578 Indian immigrants arriving from Calcutta were placed in quarantine no sickness occurred and quarantine was lifted after four days. Of the 2 621 rats trapped in the port area, 1,978 were

*R. norvegicus* and 645 *R. rattus* 564 carcasses were examined at the Laboratory where all were negative for *P. pestis*. Among other items of interest in this section of the Report it is noted that provision of £20 000 is to be made for the erection of new hospital buildings. Other schemes envisage the reorganization of the Staffs of European and Native Nurses and the possibility of establishing a School of Public Health providing facilities for the training of Native Medical Practitioners. Native Nurses and Fijian and Indian Sanitary Inspectors. With the exception of Lautoka Hospital the work at all other hospitals continues to increase the relevant facts read as follows —

Hospital	In-patients	Deaths	Out patients
Colonial War Memorial	3 074	228	17 330
Lautoka	2 055	118	8 797
Levuka	304	30	4 066
Lamabasa	763	36	8 383
Provincial and Plantation Hospitals, etc	3,849	344	54 048

Native Medical Practitioners in charge of dispensaries treated 42 171 cases and recorded among their patients 293 deaths. According to Appendix B of the Report there are 56 hospitals and dispensaries in the Colony. It is by no means easy from the printed list to differentiate between hospitals and dispensaries but there would appear to be 16 of the former exclusive of Mission Hospitals etc. In the text of the Report references to diseases treated during the year include the following —

Reported cases of *enteric fever* numbered 168. Of these 38 occurred in Rewa District 32 in Mba and Tavua and 27 in Suva Rural Sanitary District all these areas being on the main island of Viti Levu. The provision of an adequate and purified water supply would lead to a substantial decrease in the incidence of the disease (see comments under *Public Health* above). Of the total cases recorded 50 received treatment in the Colonial War Memorial Hospital with 11 deaths and 131 in other hospitals with 17 deaths. At the Laboratory 32 out of 240 specimens examined were positive for *Bact. typhosum*.

*Dysentery* chiefly of the Shiga variety was again prevalent with a considerably increased incidence and mortality. Altogether 1 745 cases with 148 deaths were reported 400 cases in the first 492 in the second 337 in the third and 516 in the fourth quarters of the year respectively. The north western area of the main island of Viti Levu was principally affected and from the Rewa district alone 397 cases were reported. It is believed the prevalence of the disease is less due to defective soil sanitation than to polluted water supplies and that the provision of piped supplies should eliminate these seasonal epidemics of bacillary dysentery. Among 772 faecal specimens examined at the Bacteriological Laboratory 64 were positive for Shiga bacillus 40 for Flexner 23 Schmitz 8 Sonne and the protozoan *E. histolytica* was found in 6.

Clinically *diphtheria* is said to be a rare disease in Fiji. During the year 21 cases were reported and from these the Klebs-Loeffler bacillus in more or less pure culture was isolated. Of smallpox no cases appear to have occurred but 3,500 persons were vaccinated against the disease. Under the heading *Scientific* below reference

## REVIEWS AND NOTICES

CHELLAPPAH (S F) [O.B.E. M.R.C.S (Eng) L.R.C.P (Lond) etc.] & JACOBS (W P) [M.D. Dr P.H.] *A Guide to Health Unit Procedure in Ceylon.*—88 pp With 1 plan. 1937 Colombo Ceylon Govt Press. [Review appears also in *Bulletin of Hygiene*.]

Dr Chellappa the Assistant Director of Sanitary Service and Dr W P Jacobs Representative of the International Health Division of the Rockefeller Foundation have supplied in this publication a very full description of the organization of the Ceylon Health Unit System. There is little doubt that a detailed account of the functions and activities of these units will be welcomed by a much wider circle than the workers in Ceylon for whose information this Guide is primarily intended.

In the first part of the Guide the subjects discussed are selection of the first area, co-operation with the inhabitants personnel technical staff duties procedure organization, administration survey and education. A description is given of the methods of recording vital statistics and the results of epidemiological investigations. The latter apply mainly to the detection and prevention of smallpox, plague cholera diphtheria, typhoid fever dysentery, ankylostomiasis, malaria tuberculosis and leprosy. The section on Sanitation includes the local recommendations and practice with regard to water supplies, sewage disposal refuse disposal, food sanitation control of animals including insects, and housing. There are sections on Maternity and Child Welfare procedure School Health Work and the Laboratory Service. The importance of the staff keeping diaries of working to a planned programme of forwarding regular reports and of attending the weekly staff conferences is emphasized. In introducing a specimen budget of a unit the methods of allocating the cost between the Central Government and the Local Authority are discussed.

In appendices samples of the numerous forms required for the work are shown organization chart survey card and many others which include such diversities as Maternity and Child Welfare cards, dosage tables for hookworm treatment and instruction for composting. A list of forms and statements—well over a hundred—used in the Health Unit work is given in appendix 3 the standard list of sixteen registers and their forms in appendix 4. A list of the 107 files required is in appendix 6. The technical and clerical methods of recording other unit activities are dealt with in a similar detailed manner.

It is not quite clear in what respects other than size the Health Unit differs from what the ordinary public health service would be, if it were really operative throughout the whole country. The aims and scope are those of any normal Public Health Service e.g. reliable vital statistics, notification of communicable diseases, maternity and child welfare school health work and a laboratory service. It utilizes the same type of personnel, medical officers of health sanitary inspectors public health nurses midwives and so on. The distinction may lie to some extent in the special emphasis laid on adaptation for rural areas the insistence on achieving the active and voluntary participation of the people concerned and the provision that the unit may be regarded as an area for testing methods of procedure.

The effect of establishing in a selected locality a fully equipped miniature public health service is that the local population receives

immediately benefits which might take years to reach them at the present rate of development. A corollary of this is that those regions not fortunate enough to be selected for health unit work will have to wait still longer than they normally would before receiving their average share of public health improvement unless special outside funds not hitherto available and used for public health are provided. If the staff figures of the Ceylon Health Unit were applied to Nigeria regarding its whole population for the purposes of argument as rural or semi-rural the following would be required —

Medical Officers of Health	500
Sanitary Inspectors	2,500
Public Health Nurses	2,500
Midwives	5 000

in addition to a staff of office clerks and labourers

The Health Officer in any country will naturally wish to know how his difficulties have been overcome in other parts of the world. True he may decide that the Health Unit System is not the particular form of organization most suitable for his territory. Nevertheless in arranging his programme for particular rural areas he will find the possession of A Guide to Health Unit Procedure in Ceylon of very great service.

NICHOLLS (Lucius) [M.D. B.C. B.A. (Cantab)] Director of Bacteriological and Pasteur Institutes Ceylon etc.] *Tropical Nutrition and Dietetics*—pp xi+164 With 9 figs. (4 on 2 plates) 1938. London Baillière Tindall & Cox 8 Henrietta Street Covent Garden W.C.2. [7s 6d] [Review appears also in *Bulletin of Hygiene*] D B Blacklock

This book is meant primarily for medical men who work among the masses in the tropics and its object is to give a brief account of the general principles of nutrition and to collect data referring to foods and deficiency diseases of the tropics. The author is well qualified to write such a book for he has by his researches contributed much to the knowledge of nutrition in Ceylon.

The first half of the book is concerned with an elementary treatment of the components of the complete diet—carbohydrates proteins fats minerals and vitamins. A good deal of space is here taken up with structural formulae of the compounds described, and the reviewer feels that in a book of this size and scope these formulae might have been omitted and replaced by more detailed treatment of other aspects such as the determination of the biological value of proteins. This view is strengthened by the fact that of the 15 amino acid formulae given there are small mistakes in 5 and all of the three vitamin structural formulae given contain errors or omissions. In discussing the addition of iodine to drinking water and table salt it is stated that the procedure is harmless because it is unnecessary to add the iodide to the water or salt in a proportion greater than 1-50 000. It should perhaps be made clear that this figure refers to the salt not to the drinking water [where the figure would be nearer one in a hundred million]. In dealing with vitamin B<sub>1</sub> under the heading International Unit a unit which is not the international one is described.

The second part of the book is concerned with the application of general nutritional knowledge to the special conditions of the tropics.

The calorie requirements recommended for temperate climates by the League of Nations Committee are scaled down for the tropics to a value for example of 2,600 calories for an adult male and the daily protein and Ca requirements are given as 65 gm. and 0.75 gm. respectively. Useful examples of the assessing of the food values of diets are given and of means of improving diets by suitable additions. In many cases the main difficulty in improving diets is the impossibility of obtaining milk. Incidentally the danger is pointed out of condemning "toddy" or native beer (containing yeast) unless an adequate amount of vitamin B complex can be assured in the diet.

Probably the most valuable part of the book is a series of tables giving the analyses and vitamin values of common foodstuffs particularly those grown in India, Malaya, Java and Ceylon. Most of these foodstuffs do not appear in the ordinary food tables and many workers will be grateful to the author for collecting and displaying so clearly this mass of data.

Other chapters in the book deal with signs and symptoms of common deficiency diseases, nutritional surveys, food poisoning, etc. A series of appendices gives methods of vitamin estimation, instructions for dietary inquiries, a specimen school inspection form and a description of the A.C.H. index of nutrition.

There is no question that doctors and other workers concerned with studying and improving the diet of the peoples in the tropics will do well to acquire this book both to read and to keep at hand for reference purposes.

Douglas C. Harrison

SCHMIDT (Hans) & PETER (F. M.) *Advances in the Therapeutics of Antimony* with a Preface by Dr. Philip MANSON-BAHR, C.M.G. D.S.O. M.D. F.R.C.P.—pp. x+257. With 10 diagrams. 1938. Leipzig: Georg Thieme. [Unbound Rm. 18. Bound Rm. 19.50.]

Readers of the *Bulletin* will welcome this edition of Professor Schmidt's and Dr. Peter's comprehensive work on the therapeutic uses of antimony compounds. The German edition published in 1937 was reviewed in this *Bulletin* (1937 Vol. 34 p. 669) and the changes are not sufficient to call for another review. Beyond appealing to a wider circle of readers this English edition has been slightly amplified—it is some thirty pages longer—the literature has been brought up to the end of last year and a useful list of authors is now added. Dr. Manson-Bahr has contributed a short but most interesting preface to the new edition. The name of the translator is nowhere stated. This is a pity for the work has been most excellently done—a rare accomplishment.

H. H. S.

# TROPICAL DISEASES BULLETIN.

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1938

[No 8

## LEPROSY

MACLEOD (J M H) *Leprosy in Great Britain at the Present Time — Leprosy Review* 1938 Jan Vol. 9 No 1 pp 5-12.

The number of cases in Great Britain is unknown but is estimated to be between 75 and 100. The author has previously recorded three infections of children from relatives in this country but the great majority are adults returning to Great Britain from tropical countries who are not a material source of danger as they come little into contact with the susceptible children. Twelve cases are isolated at the 'Giles' home in a remote part of Essex. Interesting historical data included in this Chadwick lecture.

McCoy (George W) *History of Leprosy in the United States.—Amer J Trop Med* 1938 Jan. Vol. 18 No 1 pp 19-34

This is the report of the Craig Lecture of the American Society of Tropical Medicine which deals with this oft-discussed subject. McCoy thinks it probable but not certain that leprosy was introduced to the Western Hemisphere after its discovery probably from Europe Asia and Africa. He points out once more that the disease spread materially in the Southern States very slightly in the Western ones but the Scandinavian introduced disease in the northern central States tended to die out. This he cannot account for as he is not in agreement with the view that climatic conditions will explain the facts. He approves of control by the colony method but holds that there is no convincing evidence that any control measures yet attempted have been successful in materially retarding the spread and prevalence of this disease.

LE BIHAN *Note sur la lèpre dans le département du M'Bomou (Afrique équatoriale française) [Leprosy in French Equatorial Africa.]—Ann de Méd et de Pharm Colon* 1937 July-Aug-Sept. Vol. 35 No 3 pp 988-997

This note deals with epidemiology and treatment. Inquiries regarding 1,832 cases of leprosy showed direct family antecedents in 1182. Goutte is very prevalent in the area dealt with but does not appear to predispose to leprosy. Elephantiasis however does for 70 per cent of operation cases were complicated by leprosy.



and the two diseases are very prevalent in the same areas. Methyl blue had a good effect on pains and the general condition when combined with chaulmoogra treatment. Capsules of hydnocarpus orally gave better results than methylene blue alone. An indigenous treatment by violent purgatives and emetics appeared to do some good in spite of their debilitating effects. L. R.

URUEÑA (Jesús González) The Leprosy Census in Mexico up to 1936. *Internat J Leprosy* Manila 1938. Jan.-Mar Vol. 6. No. pp. 47-50. With 1 fig.

In 1930 a census of leprosy cases was taken in Mexico by means of an inquiry from physicians and others, and in 1935 this was repeated. The latter revealed 3,882 cases, 53.3 per cent of whom were male. The more serious nodular cases formed 30.1 per cent. Only 13.3 per cent. were isolated in wards, 12 per cent. properly at home & 74.7 per cent. improperly at home. Prohibited trades were being practised by 27.8 per cent. The social and housing conditions of the patients were bad in 74 to 86 per cent. and overcrowding was noted in 47.7 per cent. A total of 8,739 healthy persons, including 2,739 children, were found living in the same rooms as the leprosy cases. Medical examinations made on 15,424 contacts resulted in the discovery of 88 cases who would ordinarily have escaped observation. L. R.

AUSTIN (C. J.) Leprosy Hospital, Makogai.—*Leprosy Review* 1937 Apr Vol 9 No 2 pp. 77-82.

This is a review of twenty-five years' work of this leper institution. The small island of Makogai was formed into a leper settlement by the Fijian Government in 1911, and the inmates increased from 14 in 1912 to 300 in 1917. From 1927 cases were also admitted from other Australasian British possessions to reach a maximum of 575 in 1933. The total admissions in 25 years total over 2,000, mostly Indian, a number of whom were repatriated. In 1918 the conditional discharge after two years' freedom from active symptoms was legalized, and 365 have so benefited, of whom 62 were re-admitted, mostly for trophic lesions due to old nerve damage, so not true relapses. The disease is more severe and less amenable to treatment in Fijians than in Indians, the former showing improvement in 45.8 per cent. against 67.6 per cent. in the Indians. L. R.

KLEMMMÜLLER (Victor) Lepra. Uebersicht seit 1930. [*Leprosy. Review of the Disease since 1930.*]—Reprinted from *Zentralblatt für Bakteriologie u. Grenzgebiete* Vol. 57 No. 5/6 pp. 321-424. [Numerous refs.]

MUIR (Ernest) The Epidemiology and Control of Leprosy.—*Trans Roy Soc Trop Med & Hyg* 1938. Jan. 25 Vol. 31 No. 4 pp. 377-382.

In this short paper the author states his well-known view. Compulsion has its place when applied by the community itself and not from without. Treatment by general methods to improve the health combined with chaulmoogra remedies also has an important part to play. L. R.

- BABLET (J) La lèpre problème scientifique problème social  
[Leprosy Problem.]—*Rev d'Hyg et de Méd Préventive* 1938.  
Feb Vol 60 No 2. pp 81-88 [80 refs]

This is a general discussion on prophylaxis that contains little new. The author stresses the necessity of protecting children from infection and he supports the propaganda and dispensary treatment plan adopted in India by MUR. References to a number of recent papers are given. L R

- HENDERSON (G) The Problem of Leprosy—*Med Bull* Bombay  
1938 Feb 5 Vol 6 No 3 pp 88-90

- HUIZENGA (Lee S) Leprosy Problem in Matang Halang Jukao Hsien  
Kiangsu—*Chinese Med J* 1938 Mar Vol 53 No. 3 pp.  
287-289 With 1 map

- WADE (H W) COCHRANE (R. G) & RAJ (M. Paul) The Skin Lesions  
of Neural Leprosy IV Observations in Madras, South India.—  
*Internat J Leprosy* Manila 1937 Oct.-Dec Vol 5 No 4  
pp 437-462. With 36 figs. on 6 plates.

This is the fourth paper on this subject based on observations in South India on 42 neural cases in the Willingdon Settlement. They class 7 as major tuberculoid 6 as minor tuberculoid or intermediate 5 as retrogressive papulate and the remaining 24 as simple. The last two forms preponderate to a greater extent than among Philippine or Chinese cases but on the whole the clinical features do not differ much from those of the previous groups. L R.

- VIEIRA (João Paulo) & DE ABREU (Manoel) Contribuição ao estudo  
das modificações papilares na lepra. [Changes in the Digital  
Papillae in Leprosy]—*Rev Brasileira Leprologia* S Paulo  
1938 Mar Vol 6 No 1 pp 15-20 With 10 figs. on 5 plates  
English summary

The authors have studied the finger prints of 216 lepers at the St. Angelo leper colony, São Paulo and have found definite changes in more than one third. The neural forms showed them most in 12 per cent. the macular and the mixed in 9 the nodular in 6 per cent. only. It was found to begin or to be earliest evident in the little and ring fingers [ulnar distribution?] and then spread to the others but is never sufficiently early to be of diagnostic value in this disease. The prints are well reproduced though rather small and a photomicrograph illustrates well the epithelial atrophy of the little finger of a leper and the normal condition of that of the thumb. H H S

- HUGHES (William) Tuberculoid Leprosy—*Trans Roy Soc Trop  
Med & Hyg* 1938, Jan 25 Vol 31 No 4 pp 383-399  
With 10 figs. on 4 plates & 1 diagram [24 refs.]

This is a lengthy clinical and histological study of cases in Malaya. The author thinks recent work on tuberculoid leprosy to be of great importance. His histological results agree so closely with those of WADE as not to require detailed description. The plaques and the borders of the annular lesions show similar changes. Bacilli are usually

few but may occasionally be numerous during reactions. Good photographs of the lesions in different phases are reproduced. As *Mura* pointed out lesions may disappear during recurrent diseases such as typhoid and reappear later during convalescence. He found a low incidence of tuberculoid forms in Malaya, a high incidence of the milder neural cases in Chinese and in Tamil southern Indians but low rates in children with more active disease. He regards the tuberculoid form as a stage in the natural evolution of immunity in the disease, so it is common in races which have for long been associated with leprosy.

L. R.

**TISSEUIL (J)** Lésions lépreuses tuberculoïdes disparaissant au fur et à mesure de l'envahissement des éléments cutanés encore sains [Tuberculoid Leprosy]—*Bull Soc Path Exot.* 1937 Dec. 8 Vol 30 No 10 pp 845-847

In this brief note the author describes the spread of annular tuberculoid lesions at the margin while the centres heal, but leave behind profoundly modified tissues with loss of the papillae and other structures.

L. R.

**RABELLO Jr** Données nouvelles pour l'interprétation de l'affection de Bernier Boeck Rôle de la lèpre [Bernier Boeck Affection and Leprosy]—*Internat J Leprosy* Manila. 1937 Oct-Dec Vol. 5 No. 4 pp. 483-498 [35 refs.] [Reprinted from *Ann Dermat et Syph* 1936 Vol. 7 pp 571-597]

**REENSTIERMA (John)** The Possible Rôle of Leprosy in the Etiology of the Bernier Boeck Sarcoid and Schaumann's Syndrome.—*Internat J Leprosy* Manila 1937 Oct-Dec Vol. 5 No. 4 pp 433-438

These papers discuss the clinical and pathological relationships of leprosy and the Bernier Boeck Sarcoid and Schaumann's Syndrome.

Bernier first described lupus pernio and Boeck multiple sarcoids of the skin from the dermatological point of view and Schaumann the autonomous syndrome lymphogranulomatosis benigna to include the former and also its erythrodermic manifestations. Rabello now argues that the tuberculoid form of leprosy presents similar clinical and pathological changes to the conditions just mentioned, especially as seen in South America including changes in the reticulo-endothelial gland and bone marrow tissues.

On the other hand Reenstierma disputes Rabello's position, and summarizes his conclusions as follows —

1 Leprosy may manifest itself in the form of skin affections which histologically coincide with Bernier's lupus pernio Boeck's cutaneous sarcoids and Schaumann's erythrodermia.

" 2 Leprosy is able to cause in the bones, and perhaps also in the lungs, changes which radiologically are strikingly like those that have been observed in connection with these skin affections.

3 It has not been shown or proved that the macro-organism of leprosy can cause the systemic reactions which together constitute Schaumann's syndrome.

" 4 In order to show that such might be the case it would be necessary to make specially directed postmortem examinations.

L. R.

MIRO GALVEZ (A.) Study of a Benign Form of Leprosy localised in the Feet.—*Leprosy Review* 1939, Apr Vol 9 No 2. pp 71-76 With 8 figs.

is is a short illustrated description of 14 cases of a chronic form of neural leprosy with lesions limited to the feet including deformities of the toes and perforating ulcers. Chaulmoogra preparations much improved the nerve conditions and in mixed cases produced healing and loss of the lepra bacilli

BOUSEFIELD (C E) The Ulcers of Leprosy.—*Internal JI Leprosy* Manila 1938 Jan-Mar Vol 6 No 1 pp 73-74

This paper describes a successful treatment for large ulcers of leprosy. These cases are liable to be very resistant and not infrequently end in death from septic complications. The presence of an anaesthetic area is an important diagnostic feature and lepra bacilli can often be demonstrated. Any necrosed bone must first be removed and only mild antiseptic solutions and dressings applied because there is no use of pain to warn against danger. General treatment includes intramuscular as well as intradermal local injections in the anaesthetic areas of iodized chaulmoogra esters the latter not exceeding 0.5 cc. For local antiseptic treatment from 0.5 to 2 per cent copper sulphate solutions have proved best for frequent washing and applications on dressings several times a day. Plentiful good food including cod liver oil is also essential. By these means the former despair induced by large leprosy ulcers has been replaced by an assurance that they can always be cured with the co-operation of the patient

LOWE (John) & CHATTERJI (S N) Extensive Ulceration of the Skin in Leprosy.—*Leprosy in India* 1938 Jan Vol 10 No 1 pp 7-8 With 3 figs. on 1 plate

REISS (F) Erythema Nodosum Leproticum.—*Chinese Med JI* 1937 Sept Vol 52 No 3 pp 367-376 With 7 figs on 3 plates (15 refs) Also in *Internal JI Leprosy* Manila 1937 Oct-Dec Vol 5 No 4 pp 427-432 With 7 figs on 2 plates, [15 refs]

DURAN (J) & BOYNET (J) Lépides érythémato-circumécus pousseé nouvelle chez une hansenienne régulièrement traitée (Exacerbation of Cutaneous Lesions of Leprosy in a Patient under General Treatment).—*Marseille Med* 1937 Sept 5-15 Vol 74 No 25-26 pp 205-208

YAMARAKI (Eisô) Ueber Pemphigus leprosus [Pemphigus leprosus].—*Japanese JI Dermal & Urol* 1937 Vol 15 Vol 42 Supp to No 4 pp 269-273

VALLÉ (Sergio) Prophylaxie de la cécité au cours de la lèpre [Blindness in Leprosy].—*Arch d'Ophthalmologie* 1937 Oct Vol 1 No 10 pp 865-880

This paper records the experience of a Brazil eye specialist. He finds that it is impossible to prevent insidious affections of the eye developing in the course of leprosy often ending in blindness.

unfortunately, chaulmoogra preparations are liable to provoke dangerous reactions in the eye, so they should be avoided on the occurrence of such complications. The anterior segment of the eye is the seat of leprosy disease and the author holds that the organ may be invaded from affections of the neighbouring parts such as the eyebrows and eyelids. He therefore advocates cauterization, peritomy or trichotomy to prevent such invasions. Copper and gold salts may also be of value and he also endorses the trypan blue treatment of Muir and Chatterji.

L R

LOWE (J.) A Note on the Classification of Cases of Leprosy — *Leprosy in India* 1938 Jan Vol 10 No 1 pp 3-6

The author makes some further suggestions on classification although he indicates that the subject should be thrashed out at the Cairo Conference. He would now add to the various groups of letters he has already advised a — for negative bacteriologically and + + + or + + + to indicate the finding of a small a moderate or a large number of bacilli in the lesions.

L R

RYRIE (G A.) The Classification of Leprosy — *Leprosy Review* 1938 Jan Vol 9 No 1 pp. 20-24

This author also criticizes the Manila classification and suggests adding to that nomenclature indications of the resistance shown by the patients. Thus M represents minus-variants as regards resistance and P plus-variants. Thus PC3 would represent an acute generalized attack of tuberculoid leprosy. The various modifications of the Manila classification will thus soon require the use of most of the letters of the alphabet.

L R

KUSNETZOW (V N.) The Dynamic Classification of the Forms of Leprosy — *Internat J Leprosy Manila* 1937 Oct-Dec. Vol. 5 No. 4 pp 407-418.

This is a further criticism of the Manila Conference classification. The author suggests that leprosy cases should be classified in accordance with the phase of the illness. He divides them into (1) the first or latent period which is the initial quiescent phase after infection (2) The second or florescent stage of progressive disease subdivided into benign and malignant cases (3) The third, or relatively stable stage in which a considerable degree of immunity has developed and (4) the fourth or healed period beyond the danger of relapse which he regards as a rare occurrence. This division will serve as a guide to treatment with chaulmoogra preparations and gentle cauterization in the benign cases in the active phase but sanatorium régime and general tonics in the malignant cases in which active treatment may do harm.

L R

DA ROSA (A Ferreira) Reação leprotica. [The Leprosy Reaction.] — *Rev Brasileira Leprologia*. S Paulo. 1938. Mar Vol. 6. No 1 pp 1-13

A general review of the literature on the subject of the leprosy reaction, of which the author mentions three types, cutaneous, neuritic and mixed. He agrees that it is an allergic (or parallergic)

reaction and experimentally can be provoked by administration of iodide. The reaction he maintains is not of specific origin because Hansen's bacillus is not found in the reacting skin  
H H S

RADNA (R) L'examen bactériologique dans le diagnostic de la lèpre Notes comparatives entre la valeur de la méthode de recherche directe dans le sang et les autres méthodes usuelles. Première note Bacteriological Diagnost.—Ann Soc Belge de Méd Trop 1937 Dec 31 Vol 17 No 4 pp 555-563

The results of different methods in 162 cases are reported. The author found that in cutaneous and mixed cases the microscopical examination of the sediment of dehaemoglobinized blood taken from a vein preferably during fever gave good results with 84.31 per cent positive. Incisions of lesions were positive in 76.36 per cent, and nasal mucus in 68.65 per cent. Among 7 nerve cases the blood test gave two positive and three slightly so  
L R

LLERAS ACOSTA (Federico) The Specificity of a Bacillus Isolated from the Blood of Lepers.—Internat J Leprosy Manila. 1938 Jan-Mar Vol 6 No 1 pp 91-93

This is a summary of an important paper on the culture of the leprosy bacillus and nearly constant specific reactions obtained with it in leprosy patients. The author in May 1933 reported in Bogotá the successful cultivation on Petraghani's medium of an acid fast bacillus from the blood of nodular leprosy cases. He has since kept it in pure culture and made over forty subcultures. He now reports successful complement fixation tests with the organism cultivated from 20 out of 66 leprosy cases using a methylic antigen prepared by the technique of Boquet and Negret [Negret?] in the case of the tubercle bacillus and with Kolmer's complement deviation test. He has made 3,038 tests. These include 638 reactions with sera of clinically and bacteriologically confirmed lepers with 99.33 per cent positive. Of 360 tests on clinically positive but bacteriologically negative patients 92.5 per cent gave positive reactions. Among 211 tests with sera of the children of lepers resident in leper colonies 11.33 were positive and among the healthy living with leper relatives 18.48 per cent were positive. In 160 persons considered to be cured 38.12 per cent were positive. On the other hand among 264 persons with diseases other than leprosy only 1.52 per cent were positive and among 1,194 healthy persons only 0.09 per cent gave reactions.

Tests by intradermal injections of leprolina made from the cultures gave positive reactions in healthy persons but negative in leprosy patients indicating the development of immunity in the latter. If the above results are confirmed an important advance will have accrued.  
L R

LLERAS ACOSTA (Federico) Pruebas de la especificidad de un bacilo aislado de la sangre de los leprosos [Tests of Specificity of a Bacillus Isolated from the Blood of Lepers].—Bol Oficina Sanitaria Panamericana 1938 May Vol 17 No 5 pp 394-395

[This is a later publication dealing with the same subject as the foregoing.]  
In May 1933 Professor Lleras Acosta of the Bogotá School of Medicine informed the National Academy of Medicine that he had

succeeded in isolating from the blood of lepers suffering from the nodular form of the disease an acid fast organism which he had cultivated in Petragnan's medium and which showed the morphological and grouping characters of Hansen's *Mycobacterium leprae*. He has kept the culture going for four years—fifty subcultures—and it maintains its original characters. He now states that with this organism complement fixation tests prove positive with the serum of lepers, negative with normal sera also that a glycerin extract inoculated intradermically in non-leprosy persons provokes an immunity reaction that animal inoculation into guinea-pigs, rabbits, rats, mice, monkey (*M. rhesus*) and horse causes lesions which Bogotá pathologists regard as leprosy and lastly when injected in lepers brings about modification of their lesions.

Of 638 tests with lepers clinically definite and confirmed bacteriologically, 634 (99.3 per cent) gave positive serum reactions, the antigen being prepared in the same way as that of Boquet and Nègre for tubercle of 360 lepers of the macular or maculo-anaesthetic type but not confirmed bacteriologically the nasal mucus showing none, 333 (92.5 per cent) were positive. Of 211 sera from children of lepers 24 (11.3 per cent) were positive and of another 211 apparently healthy persons living with their leprosy parents 39 (18.4 per cent) were positive. Of 160 thought to be cured (by a Medical Board) 61 (38.1 per cent) were still positive. Lastly of 264 suffering from diseases other than leprosy, 4 were positive and of 1184 healthy persons one reacted.

H H S

Mora (E.) The Erythrocyte Sedimentation Test in Leprosy—*Internal J. Leprosy* Manila 1937 Oct-Nov-Dec Vol. 5 No 4 pp 419-426 With 1 fig

This paper describes the simple technique of the sedimentation test and indicates its prognostic value and help in treatment on the lines previously described by the author.

L. R

Mora (Ernest) & Roy (T. V.) The Significance of Positive Wassermann and Kahn Reactions in Leprosy—*Leprosy Review* 1938 Jan. Vol 9 No 1 pp 13-18.

The authors report simultaneous and repeated Wassermann and Kahn tests in cases of leprosy in view of the frequency of positive reactions in cases showing no signs of syphilitic infection either clinical or post-mortem.

They conclude that in mild and early cases of leprosy positive reactions indicate coincident spirochaetal disease. On the other hand, in advanced cutaneous and mixed cases especially those subject to attacks of lepra fever a positive reaction by itself does not indicate syphilitic infection, as it may be due to some other factor possibly connected with bacilluria.

L. R

GUNDERSEN (Edv.) & BERNER (Ole) Om Wassermanns reaktion ved Lepra [Wassermann's Reaction in Leprosy]—*Norsk Mag. f. Lægevidenskaben* 1938 Apr Vol 89 No 4 pp 333-378. German summary [Summary appears also in *Bulletin of Hygiene*]

The quite considerable literature on the subject of Wassermann's reaction in leprosy between 1908 and 1937 would lead one to suppose

that leprosy the tubercular rather than the anaesthetic form can give a positive Wassermann reaction. This conclusion comes to by observers in every part of the world where leprosy exists means that the Wassermann reaction cannot be regarded as strictly specific for syphilis. Since 1926 however the correctness of this conclusion has been challenged more and more and the positive Wassermann reactions observed in cases of leprosy have been attributed to overlooked syphilis. Gundersen and Berner have examined the serum in 10 cases of lepra tuberosa 11 of lepra maculo-anaesthetica and five of lepra nervosa and have found two in which the Wassermann Kahn and Meinicke II reactions were positive. In one of these cases there was a definite history of syphilis for which injections of neosalvarsan had been given. This was a case of lepra tuberosa. In the other case one of lepra maculo-anaesthetica there was indeed no clinical history of syphilis in the 79-year-old woman who had worked in a very syphilitic milieu as a young woman. In spite of this very slender clinical evidence that the serological evidence tallied well with a diagnosis of latent syphilis and they say that those who constantly have to do with latent syphilis know that one often meets individuals whose markedly positive Wassermann reactions persist in spite of age and all specific treatment and without any clinical evidence of neuro-syphilis. So in their opinion there was nothing in their researches to support the view that leprosy by itself can give rise to a positive Wassermann reaction.

RODRIGUEZ (Jose N.) Observations on the Leprolin (Mitsuda) Reaction. — *Monthly Bull. Bureau of Health* Manila. 1937 Nov Vol. 17 No 11 pp 389-408 [16 refs.] Also in *Internat. J. Leprosy* Manila 1938 Jan-Mar Vol 6 No 1 pp 11-32. With 4 figs. on 1 plate [16 refs.]

The author reports an investigation of the Mitsuda reaction with a view to elucidating its nature. He regards the negative results of injections of leprolin prepared by making an emulsion of nodules containing numerous bacilli in young infants as non-specific. On the other hand the lack of response among cutaneous cases of leprosy is a condition of specific energy. A positive reaction in such cases is a favourable sign although not necessarily a guarantee of early improvement to a negative bacteriological stage. The leprolin reaction differs from the tuberculin one in its maximum being delayed until the end of the second week, instead of occurring after 48 hours. Laboratory animals that are resistant to human leprosy fail to react to leprolin.

CARPOS (Nelson Souza) Resultado do Leprolin Test nos prevenidos de filhos de leprosinos. [The Leprolin Test in Healthy Children of Lepers.] — *Rev. Brasileira Leprosia* S Paulo 1938 Mar Vol. 6 No 1 pp 31-48 [12 refs.] English summary.

Authors have generally agreed that the leprolin test gives negative results in those who have never been in contact with lepers—because there has been no call for the development of antibodies. It is also negative in cases such as those of the cutaneous and mixed forms where the antigens greatly preponderate over the antibodies positive among those who have lived in association with lepers although they



present no recognizable symptoms—specific antibodies having been produced by repeated infection with bacilli in small numbers positive also in maculo-anaesthetic and tuberculoid cases with small lesions or lesions in which the bacilli are not seen that is in cases where antibody formation has been active

For their tests the authors used lepromine Hansen prepared as follows, according to the method of Mitsuda Hayashi —

Fresh nodules are excised and the skin removed, and are heated in a water bath in physiological saline for 40–60 minutes. They are then triturated 1 gm to 20 cc saline and sterilized after filtration the filtrate is autoclaved. After addition of phenol to 0.5 per cent. the product is preserved in vials.

For those of 12 years or more 0.02 cc is injected intradermically for younger children half this dose and the reaction observed on the eighth, fifteenth and twenty-first days. In all, 331 were tested, 174 boys, 157 girls. 31 under 3 years of age, 228 between 3 and 13 years and 72 over 13 years. The number positive increased with advance in age—of those under 3 years 22.6 per cent. reacted, between 3 and 13 years 53.4 per cent. in those over 13 years 86 per cent. None of those who had been removed from their parents at birth gave any reaction and the percentage positive increased with the length of time they were left with the parents. Between 1 and 12 months 45 per cent. 1–3 years 68 per cent. 3–5 years 74.2 per cent. and over 5 years 84.5 per cent. reacted positively. H H S

PARMAKSON (P) Ueber die Hautreaktion mit Leprolin bei Lepra-kranken und ihre klinische Verwertung. The Cutaneous Reaction with Leprolin and its Value. *Arch f Schiff's u Trop Hyg* 1938 Mar Vol 42 No 3 pp 117–123

The author reports on leprolin tests in 60 leprosy cases with negative reactions in 68.4 per cent. of tubercular, 22.3 per cent. of mixed and 6.6 per cent. of macular anaesthetic cases. His results also agree with others in showing a favourable prognosis with positive reactions and *vice versa*. L R

McKINLEY (Earl B) The Present Status of Diagnostic Skin Tests in Leprosy. *Internat J Leprosy* Manila 1938 Jan–Mar Vol. 6. No 1 pp 33–46

The author reports his experience of 5174 skin tests with various acid fast bacillus antigens. (This work has already been reviewed in this *Bulletin* 1938 Vol. 35 p 295) L R

NIZZI (Pasquale) La diagnosi precoce della lebbra. [Early Diagnosis of Leprosy]. *Giorn Ital di Clin Trop* 1938 Mar 31 Vol 2 N.S. No 3 pp. 74 77–8 (15 refs)

LIMA (Lauro de Souza) Sobre a moderna terapeutica anti-leprotica. [The Modern Treatment of Leprosy] (a Monografia dos Arquivos do Sanatorio Padre Bento) —91 pp With 3 graphs [Refs in footnotes] Departamento de Profilaxia da Lepra do Estado de S Paulo, 1937 São Paulo Soc. Impressora Paulista Ltda Rua Scavero 152

This work gives with a wealth of detail an account of the treatment of leprosy by means of chaulmoogra and its derivatives and the results attained at the Padre Bento leprosanum. The author deals with

the choice of drug, its methods of use its dosage duration of treatment and the evaluation of results. A whole chapter is given up to the Plancha or intradermal infiltration method originally tried out at the Culsion Leper Colony in the Philippines its main disadvantages are the pain of multiple pricks the time taken and the need for technical skill but of these the first is the only one of any importance and it is often negligible because the site of injection is more or less anaesthetic. On the other hand its advantages are the almost complete absence of general reaction and usually only slight local reaction an acceleration of resolution of the lesions treated the general improvement and the psychological effect on the patient as he sees the disappearance of the lesion.

Evaluation of results in the Padre Bento Sanatorium is detailed the cases being subdivided into a large number of groups. Briefly the results may be summarized by saying that of 500 patients treated for periods varying from six months to six years 271 (54 per cent) were benefited 155 (31) remained with the condition unchanged and 74 (15) became worse. He notes also the influences of other factors—age type of disease duration of treatment etc and draws the following conclusions—

- 1 That chaulmoogra treatment at the Sanatorium has brought about improvement in a majority of the patients.
- 2 That to assess its value attention must be paid to the clinical and bacteriological results and not to the former only.
- 3 That special treatment of local lesions the nasal for example and of general adverse concomitant conditions is necessary.
- 4 That chaulmoogra did not seem to have any effect on ocular lesions.

RYRIE (G A) The Treatment of Tuberculoid Leprosy—*Leprosy*  
*Review* 1938 Apr Vol 9 No 2, pp 51-55

A report of trials of different methods with controls. Experience at the Sungai Buloh leper institution of Malaya showed that intradermal chaulmoogra ester injections produced little benefit in the majority of tuberculoid forms of leprosy, although the best method in the cutaneous variety with abundant lepra bacilli. Trials of different methods were therefore made in groups of twenty adult males beginning with a control group given only injections of normal saline. This proved a popular method on account of its painlessness but it had only a psychological effect for after four months half the cases were slightly worse. In a second group 3 grains of phthalic acid dissolved in 5 cc of hydriocarpus oil produced acute inflammation on injection and in a third group intradermal esters had also to be given up for the same reason. The fourth group was treated with large subcutaneous doses of 1 cc of hydriocarpus oil for each 10 pounds of body weight for four months with 2 stationary 20 improved and 2 worse and this has proved the best method of treatment. Phthalic acid intravenously in a 2 per cent solution caused reactivation and retrogression so was definitely harmful.

L R

RYRIE (Gordon A) The Treatment of Leprosy—*Malaya Branch*  
*Brit Med Assoc* 1938 Mar Vol 1 No 4 pp 305-315

This is a useful guide for those with little experience of the disease. It includes much of the information in the foregoing paper together with simple information on diagnosis and classification.

L R

LOWE (J) & DE V. K. Tests of the Suitability of Hydnocarpus Oil for Injection.—*Leprosy Review* 1938 Jan. Vol. 9 No 1 pp 32-36

This note gives much practical information on this important subject. The main points are that the oil should be prepared from fresh fruits after removal of the dirty outside of the seeds and filtered to remove such impurities. To detect adulteration the specific rotation of a good oil should be from 53° to 57°. It should be stored in full bottles in cool shade to prevent oxidation and not used after one year. The acidity should be less than 3 per cent and in a good oil may be less than 1 per cent. Only a small amount of peroxides should be present. For tests for estimating such impurities the original paper must be referred to. L. R.

LE QUÉREC (M.) Unsaponifiable de l'huile de chaulmoogra (Unsaponifiable Chaulmoogra Oil).—*Bull Soc Path Exot* 1937 Dec 8 Vol 30 No 10 pp 889-891

This paper deals with the isolation of an unsaponifiable fraction of *H. antelmistica* oil and its trial in a few cases of leprosy with negative results. L. R.

TISSEAU (J.) Action comparée des huiles d'olive et de chaulmoogra en injection intradermique. Olive and Chaulmoogra Oils Intradermally.—*Bull Soc Path Exot* 1938 Mar 9 Vol 31 No 3 pp 231-233

In this note the author compares the action of intradermic injections into tuberculous leprosy lesions of chaulmoogra and olive oil respectively. The chaulmoogra oil produced disappearance of the leprosy infiltration, but olive oil had no effect on the lesions. L. R.

BERG & NOUËNOT (L.) Observation d'un cas de lèpre cutanéo-mucosae traitée et amenerée par le bleu de méthylène. [A Case of Mucocutaneous Leprosy treated by Methylene Blue. Improvement.—*Bull Soc Path Exot* 1938 Feb 9 Vol 31 No 2 pp 92-94

PIÉRI SARDOU & BARTESI. Lèpre mixte traitée par le bleu et l'hyrganol présence de bacilles dans le sang périphérique. [A Case of Mixed Leprosy treated by Methylene-Blue and Hyrganol].—*Marseille-Méd* 1937 Sept 5-15 Vol 74 No 25-26 pp 209-211

DE RAADT (O. L. E.) & PARJOYO (R.). De phenoltherapie der lepra en tuberculose (2de Mededeeling). [Phenol Treatment of Leprosy and Tuberculosis].—*Geneesk Tijdschr v Nederl Indië* 1938, Feb 22 Vol 78 No 8 pp 435-439 With 12 figs on 3 plates

MARTY (J.) La sympathectomie péri-artérielle dans le traitement des ulcères de la lèpre nerveuse [Sympathectomy for Perforating Ulcers].—*Bull Soc Path Exot* 1938 Mar 9 Vol 31 No 3 pp 199-201

The author records four cases of perforating ulcer of the foot in which healing took place shortly after femoral sympathectomy.

Three have not been followed up for long and the remaining case has developed ulceration of the other foot so this treatment should be combined with medicinal methods  
L R

GOLOVINE (S) Essais sur le traitement des cas de lèpre à réaction syphilitique positive [Treatment of Lepers with Syphilitic Reactions.]—*Bull Soc Path Exot* 1937 Dec 8 Vol. 30 No 10 pp 839-843 [20 refs]

The author agrees with the view that the presence of syphilitic infection makes the treatment of leprosy more difficult. He has used antisyphilitic treatment in 42 cases with positive reactions and followed them up long enough to judge. He finds the mixed treatment much more rapidly beneficial than simple anti-leprosy medication  
L R

NODENOT (L.) Sur un cas d'incompatibilité des traitements anti-syphilitiques et antilépreux Incompatibility of Anti-Leprotic and Anti-Syphilitic Treatment.—*Bull Soc Path Exot* 1937 Dec 8. Vol. 30 No 10 pp 843-845

This is a brief report of a case of leprosy complicated by syphilitic ulceration of the palate with perforation in which anti-leprotic treatment proved harmful but healing took place under anti-syphilitic treatment alone  
L R

KEIL (Ernst) Ist Nervenlepra ätiologisch einheitlich? Zur Vitamin B<sub>1</sub> Behandlung der Nervenlepra. [Vitamin B<sub>1</sub> in Nerve Leprosy]—*Arch f Schiff- u Trop Hyg* 1938 Jan. Vol. 42 No 1 pp 1-13 [68 refs]

The author discusses whether the aetiology of nerve leprosy is always uniform. He points out that as in vitamin B deficiency the peripheral nerves supplying the distal portions of the extremities are attacked. He therefore suggests the trial of Vitamin B<sub>1</sub> in nerve leprosy and thinks that the use of efficient doses will be facilitated when it can be made simply by synthesis.  
L R

McCoy (G W) Communicability of Leprosy and Application of Control Measures.—*Arch Dermat & Syph* 1938 Feb Vol. 37 No 2. pp 169-174

This is a brief general discussion of the question by an American authority. The transmission of the disease is first discussed. Racial susceptibility is doubtful. Transmission within the family is important but predisposition and the predisposing influence of other diseases is questioned. The exact mode of transmission is uncertain. Isolation measures of a rigorous nature have been most relied on but he holds that there is no real proof of the efficacy of segregation as a measure of public health largely on account of the difficulty of finding early cases. There is no substantial evidence that the vigorous measures taken in the Philippines have reduced the number of lepers

KUDICKE (R.) & VOLLMAR (H.) Gewebekulturversuche mit den Bazillen der Rattenlepra [Tissue Cultures of Rat Leprosy Bacilli.—*Zent f Bakt I Abt Orig* 1937 Vol. 140 No 38. Beiheft pp 293\*-297\* With 2 figs]

The authors' researches on this subject are recorded and illustrated. Colonies of the rat leprosy bacillus were observed in tissue cultures and also numerous organisms within individual cells. They proved to be positive up to 100 days in the case of lepromata and in subcuticular tissues respectively alone and up to 73 days in the case of infected gland tissue and for intermediate periods in the case of mixed lepromatous and either subcuticular or sarcomatous tissues. Moreover under the conditions of the tissue cultures the organisms remained infective for certainly up to 22 days, and in the case of relatively bacillus rich tissues occasionally up to 89 to 100 days. L. R.

LAUPE (P. H. J.) & LOBEL (L. W. M.) Rattenlepra. Zesde mededeeling Experimenteele contact en voedingsinfectie van witte ratten [Rat Leprosy Experimental Contact Infection].—*Geneesk Tijdschr v Nederl Indië* 1938. Jan 25 Vol. 78. No 4 pp 179-190 With 2 figs. on 1 plate English summary.

The authors record the following results from contact infection of rat leprosy. Young white rats became infected on close contact with white rats with leprosy skin lesions. The contact included clawing, biting and cannibalism, but ectoparasites were not observed and could be excluded. Glandular forms of rat leprosy failed to infect healthy young white rats so the method of infection in this common form of the disease is uncertain. L. R.

PRUD'HOMME (R. O.) L'acide ascorbique dans la lèpre murine. [Ascorbic Acid in Rat Leprosy.—*C. R. Soc Biol* 1937 Vol. 126. No 33. pp 1004-1005]

This short note records estimations of ascorbic acid in rat leprosy lesions. These showed the affected tissues to be very rich in this vitamin, which was present in the supernatant fluid after centrifuging an emulsion of a leproma. There was a nearly constant relationship between the amount in the spleen and in a leproma. Cells nearly destroyed by a mass of the bacilli showed more of the vitamin than normal cells. L. R.

TANGUY (Y.) Action de l'oléate et du laurate d'éthyle sur l'évolution de la lèpre murine expérimentale [Ethyl Oleates and Laurates in Rat Leprosy].—*Bull Soc Path Exot* 1937 Dec 8 Vol. 30 No 10 p 848.

Trials of these substances in tuberculosis led the author to test them in rat leprosy. The results indicated that they are of little value. L. R.

BERNY (P.) & TANGUY (Y.) Conservation de la vitalité du bacille de Stefansky chez le cobaye [Vitality of Rat Leprosy Bacilli in Guinea-pigs].—*Bull Soc Path Exot* 1938. Jan. 12 Vol. 31 No 1 pp 40-42.

The authors had previously found that the Stefansky bacilli of rat leprosy can preserve their pathogenicity in guinea-pigs up to 39 days. They now extend this period to at least two months. L. R.

MALARIA.

LEAGUE OF NATIONS Geneva. The Treatment of Malaria. Fourth General Report of the Malaria Commission and Appendices.—Off print No 5 from the *Bulletin of the Health Organisation* 558 pp Ill.

The Fourth General Report of the Malaria Commission has already been reviewed [see this *Bulletin* 1938 Vol 35 p 408]. As regards the various appendices abstracts have already appeared of some of these [see this *Bulletin* 1938 Vol 35 pp 36 408 422] others are in the press and will appear in a forthcoming issue  
H H S

HILL (Roy A) & GOODWIN (M H) Jr "Prontosil in Treatment of Malaria. Report of 100 Cases.—*Southern Med J* 1937 Dec Vol. 30 No 12 pp 1170-1172. With 1 graph & 1 chart. [12 refs]

The hundred patients observed in this experiment were taken from an area where malaria is hyperendemic throughout the year. Seven were cases of *vivax* infection the remainder *falciparum*. All had parasites in the peripheral blood when treatment began and the temperature of the cases ranged between 100 and 104 F. In most cases prontosil was given intramuscularly 10 cc every 12 hours. It was seldom necessary to give more than four injections. Usually after the first injection there was marked improvement and cessation of fever. After four injections most patients were able to return to work. No relapses had been noted up to the first half of October (the experiment began on August 1st) but there were two cases of reinfection 29 and 31 days respectively after the completion of treatment. Apparently the more severe the symptoms the more rapidly the drug acted.

Vorman White

PUBLIC HEALTH REPORTS 1937 Oct 15 Vol. 52. No 42. pp 1460-1462.—Treatment of Malaria with Sulphonamide Compounds.

This is a translation of a note by Dr Amonario Díaz DE LEÓN of Cardenas San Luis Potosi Mexico who has treated 15 cases of benign tertian malaria with rubiazol (prontosil) with completely satisfactory results. The drug was given in tablet form except for one patient who received one intramuscular injection. He considers rubiazol to be an effective specific drug for *vivax* infections. The Editor of the Public Health Reports believes this to be the first report on the use of sulphonamide compounds in the treatment of malaria. \ II'

Díaz DE LEÓN (Amonario) Primeros casos de paludismo tratados por un derivado de la sulfanilamida. [First Cases of Malaria treated with Sulphonamide Derivatives.]—*Boletín Oficina Sanitaria Panamericana* 1937 Vol. 16 No 11 pp 1039-1040

See above.  
(115)

READ (Héctor) & PINO (Jaime Oliver) Versuche mit den Sulfonamid-Präparaten bei der Malariabehandlung [Investigations on the Treatment of Malaria by Sulphonamide Preparations.]—*Arch f Schiffs u Trop Hyg* 1938. Mar Vol. 42. No 3 pp 132-134

The authors conclude from their observations on cases of benign tertian malaria that sulphonamide has a poor specific antimalarial action because it has neither a sufficiently definite schizontocidal action nor is it a noteworthy gametocide E D W Greg

FARINAUD (M) Essais de chimioprophylaxie du paludisme par le traitement des porteurs d'hématozoaires à l'aide des médicaments synthétiques Treatment of Malaria Parasite Carriers with Synthetic Drugs.—*Bull Soc Path Exot* 1938 Feb 9 Vol. 31 No 2 pp 163-167

LAVERGNE (J) Remarques sur la communication de M le docteur Farinaud—Ibid pp 167-169

School-children to the number of 322 in Antsirabe and in two other equally malarious localities in Madagascar all of whom were harbouring malaria parasites were treated with quinacrine for five days followed by rhodoquine for 3 days. Some of the children received only one such treatment others received a second course of treatment three months after the first. The blood was re-examined 15 days to a month after the completion of treatment. The percentage of children who were free from parasites was 71 to 76 in the case of two groups of children that had received but a single treatment and 84 and 96 in the case of two other groups that had received two courses of treatment. No gamete carriers were found after treatment. A few children were completely refractory to the treatment.

Dr Lavergne also considered that for collective prophylaxis the synthetic remedies give better results than quinine. Given weekly or bi-monthly the cost is somewhat less than daily dosage with quinine and the action of rhodoquine or praëquine on the gametes is a great advantage. He has been very favourably impressed with the extreme efficacy and perfect innocuity of rhodoquine. Quinacrine is an irritant to the digestive mucosa and it is important not to administer the drug on an empty stomach. If this precaution be taken digestive troubles will rarely follow its use. Helminths sometimes render the host intolerant of quinacrine. V II

MUEHLEN (P) Certuna™ ein neues Tropikagametenmittel. = Certuna a New Gametocide in Malignant Tertian Malaria.—*Deut Med Woch* 1938 Feb 25 Vol. 64 No. 9 pp 295-297

The author describes his observations in 113 cases of malaria over a period of 2½ years with this drug. Certuna (Bayer) is put up in tablets for oral administration (chemically it is, dialkylamino-oxy quinoxalimobutane). When given in doses of 0.02 gm. daily for 5 days the author has not observed any toxic signs, e.g. cyanosis of lips, and no formation of methaemoglobin. In severe cases of malignant tertian malaria he recommends an intramuscular injection of 0.3 gm. atebem imaconate then atebem by the mouth for 4 days more in doses of 0.1 gm. thrice daily. After the temperature has come to normal

or in cases when there is no fever but numerous crescents have been determined in the blood then give on three successive days Certuna in doses of 0.01 gm. simultaneously with atebryn 0.1 gm. thrice daily. In persons of heavier body weight and in all cases with very numerous crescents Certuna may be given in doses of 0.02 gm. thrice daily. It was shown that the crescents ceased to flagellate on the second day of the administration of Certuna in doses of 0.02 gm. thrice daily. Also a daily dose of 3 tablets of 0.01 gm. Certuna was found to render the crescents after the second day incapable of further development in the mosquito. He found that the daily administration of three tablets of Certuna of 0.01 or 0.02 gm. for at least 3 days was well tolerated and the crescents had almost always disappeared from the blood at latest in 4 to 7 days. He considers Certuna is superior to plasmoquine as a gametocide in malignant tertian malaria.

SIOLI (F) Prüfung des neuen Malariamittels Certuna bei der Impfmalaria der Paralytiker. Evaluation of the New Malaria Drug "Certuna" in Inoculation Malaria in Cases of General Paralysis.—*Klin. Woch.* 1938. Apr. 9 Vol. 17 No. 15 pp. 527-528. With 3 figs. E. D. W. Greig

The author refers to the paper of KIKUTH on this drug in the same number of the Journal. He makes it clear that the results of the tests carried out in cases of general paralysis inoculated with benign tertian parasites must be regarded only as a link in the chain of evidence which must be supplemented by extensive investigations by tropical practitioners in the field. He commenced with small doses 0.01 gm. but was soon able to increase the dose till he gave 0.07 gm. thrice daily for 7 days without observing any ill effect and he was also able to give it simultaneously with atebryn without toxic signs in the latter respect it is an advance on plasmoquine. He concludes from his observations in benign tertian malaria that Certuna is well tolerated and is active. Its activity differs from the action of quinine plasmoquine and atebryn in that a cure with Certuna even in large doses is not attained but only a temporary suppression of the febrile attacks and parasites. The new drug will require to be subjected to further research elsewhere to differentiate accurately its active principles.

E. D. W. Greig

KIKUTH (Walter) Zur Weiterentwicklung der Chemotherapie der Malaria. Certuna—ein neues Gametenmittel. [On the Further Development of the Chemotherapy of Malaria. Certuna—a New Gametocidal Agent.]—*Klin. Woch.* 1938. Apr. 9 Vol. 17 No. 15 pp. 524-527.

The author gives a brief historical survey of the malaria problem and cites the views of ROSS and KOCH on the best method of attack. After indicating certain drawbacks to quinine therapy he notes the new impulse which was given to chemotherapy by the study of bird malaria and the discovery of plasmoquine. The latter is an active gametocidal agent and also prevents the gametocytes from carrying on the cycle in the mosquito. It has lowered the relapse rate and shortened the period of treatment. The drug however suffers from several disadvantages in that clinical symptoms are only temporarily allayed,



and it may give rise to methaemoglobin blue lips and finger nails as well as severe epigastric pains, especially when given in certain proportions with atebuin.

These disadvantages induced the author to seek a new gametocidal substance lacking the secondary manifestations of plasmoquine. He uses a method developed by himself to test gametocidal power in which the exflagellation of male gametocytes (*P. cathemerium*) and fertilization of the female can be followed. A dose of the drug in question is given and the effect on exflagellation studied after one hour. Small structural changes in the drug may greatly modify the experimental results and can only be studied in this way. The author's results do not always agree with those obtained by the Roehl technique nor with those on *Haemophysalis* infections in finches. The method offers technical difficulties and many controls are required.

By this method the author claims to have discovered a substance superior to plasmoquine. It is a dialkylamino-oxiquinolylamino-butane and has been given the name "Certuna." Tests have been carried out on this drug in conjunction with plasmoquine. The toxicity when given by mouth to birds on six consecutive days corresponds to that of the latter drug. Therapeutically it is inferior to plasmoquine in malignant tertian malaria but shows marked gametocidal powers. Certuna is about twice as efficacious in the *Haemophysalis* infection of finches and in exflagellation experiments likewise proves superior. There are no secondary manifestations in human cases and the new drug being compatible can be administered with atebuin. Small doses of the drug not sufficient to prevent fertilization of female gametocytes can yet at a certain stage arrest the further development of the oöcyte in the epithelium of the mosquito's stomach.

J. D. Fallon

MIRSIROLI (A.) & MOSNA (E.) La sterilizzazione dei gametociti del plasmodi malarici [Sterilization of Gametocytes of the Malaria Plasmodium].—*Riv. di Parassit.* Rome, 1938. Jan. Vol. 2. No. 1 pp. 55-71. English summary (5 lines).

This report details the results of experiments with "Cibonal" as a gametocide. This drug to which SCHULMANN its author has provisionally given the name "Cibonal," was found by him to have a fourfold greater action on the gametocytes of *Haemophysalis* of the chaffinch than has plasmoquine. It belongs to the plasmoquine series of preparations and has the composition dialkylamino-alkyl-amino-oxiquinolme. Its action on the gametes of *P. falciparum* is quite as potent as that of plasmoquine and that in doses far less than any that produce toxic symptoms. In that respect it is far superior to plasmoquine. A dose of 12 cgm a day for six consecutive days was given to a patient without producing any ill effects. A dose of 2 cgm a day for a similar period of time is a suitable therapeutic dose.

The paper details the results of experimental observations on a series of *falciparum* gamete carriers treated with varying doses of Cibonal in which the gametes were enumerated, flagellation of the gametes looked for and the infectivity of the blood for anophelines was determined each day for a week following the administration of the

drug A field experiment was also carried out in Zapponea (Foggia) with a population of about 1000 where malaria is hyperendemic. From the 1st May to the 15th October 1937 Cilonal was given to practically the whole population every three days. Infants up to one year had 1 cgm children from 1 to 6 years 2 cgm. from 6 to 12 years, 3 cgm from 12 to 19 years 5 cgm adults 6 cgm. Whereas *vivax* infections were somewhat more numerous than they had been in 1936 *falciparum* infections showed a marked reduction. In the 4 months August–November only two *falciparum* gamete carriers were discovered as compared with 36 in the corresponding period of the previous year. The authors conclude that the addition of such a drug to quinine or atabrin will give us a complete anti malaria remedy thus making possible the human bonifica envisaged by KOCH GOLGI and Gossio

N IV

DE SANT'ANA QUEIROZ (José) Sull'azione dei medicamenti nelle varie fasi di sviluppo dei parassiti malarici. [Action of Drugs on Different Stages of Development of the Malaria Parasite.]—*Riv di Parassit.* Rome. 1938 Jan Vol 2. No 1 pp 13–21. With 24 coloured figs. on 1 plate. English summary (5 lines)

The observations recorded in this paper were carried out on five *Macacus rhesus* infected by intramuscular injection of 1 cc. of blood of another *M. rhesus* which harboured very numerous parasites of *Pl. knowlesi*. All the monkeys showed parasites in the peripheral blood on the 6th to 8th day. These increased rapidly in numbers during the following two to four days. The drug used has the chemical composition of atabrin and was manufactured in Italy. In one monkey the drug was given when the majority of the parasites were small ring forms. In a second monkey when the ring forms were in a later stage of development. In a third monkey when the division of the chromatin was taking place the schizogony phase. In the fourth monkey when numerous rosettes were present. The fifth monkey was an untreated control. The blood of each monkey was examined every two hours after the administration of the drug for 24 hours and the number of parasites per 100 red cells was noted on each examination. The drug was progressively more active as the development of the parasites in the red cells progressed. It was most active when given at the stage of chromatin division. At a later stage when sporulation was taking place the drug had much less effect.

N II

MOXICO (A.) CITO (V.) & MANGIACAPRA (A.) Cura antimalarica col metodo di Maurizio Ascoli. [Ascoli's Method of Treatment.]—*Riforma Med.* 1937 Oct 23 Vol. 53. No 43 pp 1507–1511

This is a detailed account of six cases of malaria treated by Ascoli's method the intravenous injection of adrenalin. Three of the cases had been infected within the previous year. The other cases were of longer duration with very hard spleens. Three were *vivax* infections two *falciparum* and one quartan. In all the results of treatment were very satisfactory. The authors emphasize the value of this form of treatment in military practice.

A II

at the beginning of the malaria season to all children living in a Railway Settlement under anopheline control caused no permanent improvement. In 1938 another opportunity occurred of studying the matter further in the same district. A labour camp established in connection with repairs to a tunnel had an average labour strength of 308. One-fifth of the total force was changed within the first month and within three months half the original force had left. The total number of persons employed on this work during nine months was 662. All arrivals at the camp received five days' treatment with atabrin, 0.3 gm. a day followed after five days, by a single dose of plasmoquine 0.02 gm. Thereafter everyone received a similar dose of plasmoquine once a week. The work proceeded from start to finish without any delay caused by malaria and that in a district where past experience has shown that uncontrolled malaria works havoc with engineering operations. Though it was not possible to measure the additional benefit conferred by this anti-gametocyte measure the authors consider it to be too small to justify the additional cost where anti-larval measures can receive adequate attention. N IV

ROUBAUD (E.) Principes et possibilités de la prophylaxie animale du paludisme [Principles and Possibilities of Animal Prophylaxis of Malaria.]—*Arch Inst Pasteur de Tunis* 1937 Dec. Vol. 26 No 4 pp 625-664 [10 refs]

The author substantiates his claim to have been the first to determine the important rôle played by domestic animals, by the zoophilic adaptation of anophelids in causing the spontaneous disappearance of malaria from certain parts of Europe in particular. In describing how this zoophilic deviation of Anophelids has come about the discovery of the different races of *A. maculipennis* and the extent to which the zoophilic adaptation of certain of these races explains the commonly observed phenomenon of anophellism without malaria, the author traverses familiar ground but his dissertation is interesting and informative. If animals are to afford effective protection they must be kept permanently during the night in stables in close proximity to the dwellings of the human beings they are to protect. The protection is likely to fail if for any cause anopheline breeding places are much increased in number or area. This is what is meant when the importance of stabilization of hydrological conditions is stressed. Improvement in housing conditions and social progress favour the development of zoophilic deviation of Anophelids. These and other considerations lead the author to consider to what degree and in what circumstances such zoophilic deviation might eventually contribute to the reduction of malaria in North Africa, where varieties of *A. maculipennis* are also important vectors. This cannot in any case be brought about suddenly by the mere erection of stables in the vicinity of dwellings. This deviation is a vast biological phenomenon and the first necessity would seem to be a general transformation in conditions of human life.

The second part of the paper deals with anophellism without malaria and animal deviation of anophelines in the Far East notably in French Indo-China. Reference is made to the work of TOUMANOFF, BOREL, MORIN, GASCHEN, TREILLARD and others which has been duly noted from time to time in this Bulletin. N IV

CHOPRA (R. N.) & BASU (B. C.) A Preliminary Report on the Effect of Anti Malarial Drugs upon the Infectivity of the Patients to the Mosquitoes.—*Indian J Med Res* 1937 Oct Vol 25 No 2 pp 459-464 [13 refs]

This is a record of experiments carried out in Calcutta to determine the effect of varying doses of anti-malarial drugs on the infectivity of gametocyte carriers for mosquitos. Laboratory-bred *A. stephensi* 4665 in number were used. The drugs tested were cinchona febrifuge quinine sulphate malaran tebetren atabrin plasmoquine and quinine sulphate. All these drugs with the exception of plasmoquine failed to prevent the development of crescents in *A. stephensi*. Plasmoquine in doses of 0.02 gm. was effective in preventing such development. Atebrin and malaran prevented the development of gametocytes of *P. malariae* in *A. stephensi*. tebetren failed to do so. Plasmoquine alone in doses of 0.02 gm. in rarer infections failed to prevent the formation of oöcysts. a small dose of quinine was sufficient to arrest such development.

MISSIROLI (A.) Sull'o sviluppo dei parassiti malarici in nota (The Development of the Malaria Parasite).—*Riv di Parasiti* Rome 1938 Jan Vol. 2 No 1 pp 39-43 With 2 figs English summary (4 lines)

This is an interesting record of observations made on the sporozoites of *Plasmodium praecox* (relictum) injected into canaries from which the author concludes that so-called sporozoites are in reality immature sporocysts which continue their development in the lymph spaces of the canary each giving rise to a number of sporozoites not exceeding eight.

TORMANOFF (C.) Persistance des sporozoites du paludisme chez *A. minimus* après plusieurs prises de sang sur les animaux. [Persistence of Malaria Sporozoites in *A. minimus* after Several Feeds on Animals].—*Bull Soc Path Exot* 1937 Nov 10 Vol 30 No 9 pp 765-767

In a plantation in Cambodia in which there are no domestic animals a large proportion of *A. minimus* were found to be naturally infected. One such mosquito engorged with human blood was brought to the laboratory and during the next twenty days was fed five times on a buffalo. Five days later the insect was dissected 19 cysts of *Salicparum* type were found on the stomach and very numerous sporozoites of normal appearance were found in the salivary glands. Another *minimus* also infected naturally was fed on an animal ten times during the space of 16 days at the end of which it still had very numerous sporozoites in the salivary glands.

GEVTSKOV (Clean J.) A Method for the Determination of Atabrin in the Blood.—*Amer J Trop Med* 1938 Mar Vol. 18 No 2 pp 149-156 [15 refs]

The author points out that a study of the rate of absorption storage in tissues, destruction in the organism as well as rate and mode of excretion of a drug is essential in chemotherapeutic studies. In malaria the concentration in the blood is of importance. He has made

*atroparvus* form and some intermediate between these two. As there was no possibility of mating with *atroparvus* having occurred in the laboratory this result is interpreted as showing that crossing had taken place in nature between the two races—races hitherto supposed to be incapable of mixing.

V B Wigglesworth

ЕНИКОЛОВ (S. K.) Au sujet de l'écologie des *Anopheles algeriensis* Theo [Ecology of *A. algeriensis* Theo.]—*Med Parasit & Parasitic Dis* Moscow 1937 Vol 6 No 3 [In Russian pp 354-358 With 2 figs. French summary p 359]

*A. algeriensis* was found breeding in large numbers in the vast swamps that are formed by springs along the edge of the delta of the Sulak River which flows into the Caspian Sea. The larvae were found in the dense shade of reeds. The water in summer has a temperature of from 9 to 10°C. Even in winter when the atmospheric temperature falls to 11°C below zero the temperature of this water is as high as 4°C. Swarms of these insects attack men and animals at sunset—many are flying also before dawn. During the day they only attack in places where the shade is very dense. Many wild animals are found in the locality: wild boars, deer, jackals, etc. Numerous female *A. algeriensis* use the habitations in the vicinity of the swamps as daylight resting places but none are to be found in the nearest villages which are from 3 to 5 kilometres away. Adult mosquitoes first appear at the end of April or the beginning of May—in autumn they are very numerous up to the beginning of December. *A. algeriensis* appears to play a very insignificant rôle in the transmission of malaria: labourers living close to these marshes suffer very little from malaria, whereas the inhabitants of neighbouring villages, in which *A. maculipennis* is abundant, suffer greatly.

\ II

YAMADA (Manabu) A New Species of *Anopheles* in Chosen (Korea).—*Keijo JI of Med* 1937 Oct 20 Vol 8 No 3 pp 237-255 With 5 plates. [47 refs.]

The species is named *Anopheles pullus* and is fully described as egg, larva and adult. It belongs to the subgenus *Anopheles* resembling *A. kyrenensis barberoensis* etc. It bites man vigorously in houses but its relation with malaria transmission is not known.

I B Wigglesworth

GALVÃO (A. A.) LANE (J.) & CORRÊA (R.) Notas sobre os *Nyssorhynchus* de S. Paulo \ Sobre os *Nyssorhynchus* de Novo Oriente. [On the *Anopheles* (*Nyssorhynchus*) of São Paulo.]—Reprinted from *Rev Biol e Hyg* 1937 Aug Vol 8 No 1 pp. 37-43 With 5 figs. on 2 plates. English summary.

During an investigation in Novo Oriente State of São Paulo, Brazil, the authors collected *Anopheles* (*Nyssorhynchus*) *arbitaris*, *argyritarsis*, *larsmae*, *culatus*, *stodes* and *beckhami* and the following results are given.—1) *Anopheles* (*Nyssorhynchus*) *darlingi* showed morphological differences in adults, male terminalia and egg which is figured and described. These differences were to such an extent that a variety was created and named *Anopheles* (*Nyssorhynchus*) *darlingi* Root 1928 var *parulistris* n. var. Specimens from other localities (São Paulo, Porto S. Pedro, Piracaba, Amazonas, Manaus and Bata) appeared to belong as far as adult characters are

concerned to this variety. Comments are made regarding this variety and the typical form described by Root. 2) *Anopheles* (*Nyssorkynchus*) *tarsimaculatus* proved to belong to a different variety and the findings are briefly stated as a more complete account is being published elsewhere. 3) *Anopheles* (*Nyssorkynchus*) *backmani* specimens conform to descriptions for this species and the eggs are described and figured for the first time. 4) *Anopheles* (*Nyssorkynchus*) *strodei* and *albitalis* are commented on. *Anopheles strodei* from the city of São Paulo differs from the Novo Oriente specimens to some extent. 5) Adult captures inside houses were made during February 1937 March 1938 and April 1937 *i.e.* during the malaria season. The percentage of *Anopheles* (*Nyssorkynchus*) *darlingi* was from 79.7 per cent. up to 100 per cent.

The authors believe that *Anopheles darlingi* is to be considered as the most dangerous vector in this locality.

CORRADETTI (Augusto) Sulla composizione della fauna anofelica in relazione ai diversi gradi di bonifica nella valle del Lemene (Veneto) [Anopheline Fauna in Relation to Different Stages of Bonification.]—*Riv di Malariologia* Sez. I 1937 Vol. 16 No 4 pp 265-275 With 1 folding plate English summary (6 lines)

In a small tract of land 20 kilometres long and 1 kilometre broad, in the Lemene Valley between Caorle on the Adriatic and the Venice Trieste Railway Line are to be found almost all conditions from salt marshes to areas in which agricultural bonification is complete. Here a study of the anopheline fauna was carried out. Adults were collected from 65 catching stations and larvae were sought for systematically. Larvae were not numerous owing to the large number of *Gambusia* in most of the collections of water. *A. edulis* the malaria vector of the region was found in abundance where bonification had either not been or had only imperfectly been carried out and its prevalence diminished in direct proportion to the progress achieved in bonification. *A. maculipennis* var. *typicus* and *messeas* were found everywhere though *messeas* was not very abundant. N II

KALANDADZE (L. P.) & LEMER (M.) Sur l'emploi du chloropicrin contre les larves des moustiques [Chloropicrin as a Larvicide.]—*Med Parasitol* Moscow 1936 Vol. 5 No 4 pp 563-578 [In Russian.] [Summarized in *Rev Applied Entom* Ser B 1937 June Vol 25 Pt. 6 p 144]

Field and laboratory tests of the value of chloropicrin against mosquito larvae and pupae were carried out in August-October 1933 and 1934 in the environs of Tiflis. When placed in a receptacle at the bottom of the water it was effective in the laboratory but not in the field. On the other hand when sprayed at the rate of 0.05 0.1 or 0.3 gm. per litre it killed all the larvae and pupae and the water remained free from infestation for 4-5 days when the rate was 0.05 gm. and for 7-10 days when it was 0.1 or 0.3 gm. Complete mortality of larvae and pupae was also obtained in all tests by broadcasting sawdust moistened with chloropicrin when the rates of application were 0.1 and 0.3 gm. per litre the toxic action lasted 5-6 and 10-12 days respectively. The authors believe that chloropicrin acts on the larvae and pupae as a contact poison as it practically does not dissolve in water when submerged its toxic effect ceases in about 5-10 days after surface application and it was not effective when tested as a

FOX (Theodore C. C.) A Study of the Mortality Rate and Complications following Therapeutic Malaria.—*Southern Med J* 1937 Nov Vol. 30 No 11 pp 1084-1088 [28 refs.]

This is an important contribution to the literature of the dangers attendant upon malaria therapy dangers which in the opinion of the author are outweighed by the benefits conferred. It contains the records of 1 012 cases successfully inoculated with either tertian or quartan malaria, between 1922 and 1936. Of these cases 34 died, all within a month of the completion of treatment a death-rate of 3.35 per cent. Of the 34 fatal cases 17 were examined post mortem. Death in 7 of these was ascribed to myocardial failure in 8 to acute malaria in 1 to pulmonary thrombosis and in 1 to tuberculous bronchopneumonia. In this last case malaria activated a quiescent pulmonary tuberculosis. Of the 17 cases which were not examined post mortem myocardial degeneration was responsible for death in 7 nephritis in 2 pulmonary disease including bronchopneumonia and an activated case of pulmonary tuberculosis, in 7 and acute malaria in 3. Two of the acute malaria deaths were due to rupture of the spleen. Among other post-mortem findings in cases dead of acute malaria were adenocarcinoma of the pancreas haemolytic jaundice and streptococcal septicaemia, *falciparum* malaria and pulmonary collapse. There were 3 deaths after the initial malaria paroxysm 2 after the second 3 after the third, 3 after the fourth 2 after the fifth 7 after the sixth 2 after the seventh 4 after the eighth 3 after the tenth 1 after the eleventh 2 after the twelfth 1 after the thirteenth and 1 after the fourteenth.

Nihil complications were sometimes met with in therapeutic malaria headache dizziness, vomiting nose-bleeding and slight intestinal disturbance. Only 15 cases of jaundice occurred in this series of 1 012 cases most of these were seen in quartan infections. All but one were of the catarrhal type. Six cases of jaundice occurred among the non-syphilitic malarial donors.

Of the two deaths from rupture of the spleen one occurred after two paroxysms, the other after eleven. These two spleens weighed 660 and 540 grammes respectively. In therapeutic malaria there is very rarely any palpable increase in the size of the spleen.

In malaria therapy the disappearance of parietic manifestations is commonly followed by symptoms of schizophrenia hallucinatory hypochondriac manic depressive and catatonic forms occur. These post-malarial psychoses are of unfavourable prognostic significance.

Gummata rarely occur in untreated general paresis after malaria therapy their appearance is not uncommon. In two cases of the present series gummata developed in the lungs.

In one case an acute thyroiditis followed malarial treatment.

The paper contains a review of the literature of the more uncommon types of complications occurring in induced malaria. The series of cases reported shows that the more serious complications are relatively rare.

A. H.

# AMOEBIASIS AND DYSENTERY

DENNIS (E. W.) & LUND (E. E.) *Studies on the Intestinal Protozoa of Man in Syria and Lebanon. I. The Incidences of Intestinal Protozoa in Hospital Patients at Beirut.*—*Trans Roy Soc Trop Med & Hyg* 1937 Jan. 26 Vol. 30 No. 4 pp. 407-422. With 3 graphs (12 refs.)

The paper gives an account of an intestinal protozoal survey carried out amongst 4234 patients at the hospital and clinic of the American University of Beirut. Of these 42.5 per cent were positive for one or more of the protozoa while 8.43 per cent were infected with *E. histolytica*. Amoebic dysentery is an important disease in Beirut and the adjoining country and it accounts for about 10 per cent of all the dysentery cases. There was an increased incidence of amoebiasis during 1932-1933 and 1933-1934. This appears to be accounted for by the dryness of the two winters which preserved the house flies which at ordinary times are destroyed by the heavy rains. C. M. Wenyon

FISCHER (Walther) *Ueber Amöbiasis in Deutschland.* 'Amoebic Infection in Germany'—*Arch f Schiffs u Trop Hyg* 1938 Apr Vol. 42 No. 4 pp. 161-167 With 2 figs.

The possibility of the occurrence of indigenous amoebic dysentery in Germany which may give rise to severe and possibly fatal developments is discussed in this paper. A fatal case of liver abscess is reported in a man of 55 years of age a ship's engineer at Rostock, in November 1937. No positive diagnosis had been made prior to death though a tumour of the liver or gall-bladder had been mooted. On opening the abdomen half a litre of serous fluid escaped and each pleural cavity contained an effusion of 300 cc. The spleen was much enlarged (300 gm.) with perisplenitis and adhesions. The base of the right lung was compressed, a small hypernephroma. The liver itself was enormously typical amoebic ulceration of the whole large intestine and apparently also of the lower ileum, was present. The diagnosis was made weighing 8.3 kgm. on incision 5-9 litres of chocolate-coloured pus escaped. The whole of the right lobe was occupied by an enormous abscess measuring 27 x 27 x 17 cm. The diagnosis was made absolute by the demonstration of vegetative amoebae in smear preparations from the walls of the abscess and in sections of the intestinal lesions.

Apparently the patient had been at work till fourteen days before his fatal illness and then had noticed the enlargement of the liver which had become painful. There had been no diarrhoea or other intestinal symptoms. A complete blood count had been carried out—a leucocytosis of 21,400 and a secondary anaemia had been thereby revealed.

[There appears to be no indisputable proof for the contention that this *A. histolytica* infection was in the first instance contracted in Germany. It was known that the patient had been in the tropics up to 1914 and in 1908 he had suffered from malaria and up to 1934 he had been in the Mediterranean. As Fischer remarks the latent period between the original amoebic infection and the development of metastases may be very short or as long as 30 years—or even longer in the reviewer's experience. On the other hand there are authentic records of acute



amoebic dysentery being contracted in Germany—and the reviewer has recorded three such instances in War pensioners who had acquired their infections primarily in prison camps in Germany during the War. Quite recently he has seen a case with a particularly heavy infection of *E. histolytica* cysts from Vienna.] *P H Manson Bahr*

TRIBEDI (B P) & DE (M N) Observations on the Dysenteric Conditions among Europeans of Calcutta.—*Brit Med J* 1933 May 7 pp 1000-1003 With 1 chart [11 refs.]

Dysentery is a very important cause of sickness among the general European community in India. Amoebic infection is frequently encountered in specimens where the physician has hardly any suspicion of it and in which the appearance of the stool is not suggestive of such infection. Sometimes it is accompanied by symptoms of dyspepsia, vague unaccountable abdominal pain, liquid stools without obvious cause, painful enlarged liver, low-grade pyrexia and loss of weight. In some cases *E. histolytica* could be found at any time during the course of seven years, and these parasites have been seen on many occasions in specimens which could easily have been passed as well-formed and innocent-looking; the amoebae would be discovered in small shreds of mucus adhering to the surface. Particular emphasis is laid upon the injurious effect of a low temperature on the vitality of the amoebae.

The Europeans in Calcutta exist as a semi-isolated community, living apart from the general mass of the population under the best hygienic conditions. Hence the frequency of dysenteric conditions amongst them is a matter of surprise. The results of seven years' investigation are tabulated in the paper and include analyses of 1,370 specimens of faeces. Although amongst the Indian population there is a definite seasonal correlation between the two main forms of the disease—amoebic and bacillary—this was not found to be the case in the European population.

From the curative point of view, both amoebic and chronic bacillary infection are extremely hard to deal with. The source of infection is also difficult to ascertain and the conclusion is arrived at that green unboiled vegetables which are insufficiently sterilized by immersion in dilute potassium permanganate solution is the most likely. Bacillary infection, especially of the Flexner type, is common, but *Ps. procyonae*, *Bact. morangii*, *Bact. carolinum* and *Bact. faecalis alcaligenes* have also been encountered and give rise to intestinal disorder.

No definite association between the presence of Charcot-Leyden crystals and amoebiasis could be ascertained. *P H M B*

CANAVAN (W P N) & HEFLEY (H M) Investigation of Intestinal Parasitic Infections of a Selected Population of Oklahoma City.—*Amer J Trop Med* 1937 May Vol. 17 No. 3 pp. 363-383 With 1 fig. [32 refs.]

The examination of a single faecal specimen from 953 individuals connected with the University of Oklahoma Medical School and Hospital gave an infection rate for *E. histolytica* of 6.8 per cent. From the figures obtained it would appear that infections with this amoeba are as common in Oklahoma as in other parts of the country.

*C M W*

HARDY (A. V.)

A Quantitative Study—*Am J Hyg* 1937 May Vol. 25 No. 3 PP 421-429Summary appears also in *Bulletin of Hygiene*

In addition to the amoebic infections which resulted in 1933 from the exposure of employees and guests in two Chicago hotels to polluted water there occurred in 1934 a similar series of infections amongst firemen and onlookers at the stockyards fire in which the pumped water found afterwards to be polluted was used for purposes of quenching the fire. Analysis shows that of 300 firemen who worked at the fire 124 acquired amoebic infection from the water during the few hours of possible exposure. Similar calculations applied to onlookers show that of 7500 about 3100 became infected. In the onlooker group there were only six cases of actual amoebic dysentery and none in the fireman group. These results are contrasted with the infections in the hotels which resulted from exposure over longer periods. The number of amoebic infections which occurred with the duration of exposure was greater. Furthermore the incidence of cases of dysentery in the hotel people was found to vary directly with the duration of exposure. It is thus seen that the long and repeated exposures at the hotels did not lead to more infections than the short exposure at the fire but they did lead to a greater incidence of actual amoebic dysentery.

C. M. H.

IRENBER (Charles)

*New England J of Med* 1937 Nov 25 Vol. 217 No. 22 pp 859-861

Endemic Amoebic Dysentery in New England.—

The author describes three cases of amoebic dysentery which have been observed by him during the past 18 months. One was a man of 61 years who had lived in Boston for more than twenty years and his symptoms diarrhoea with passage of blood and mucus had been present for a year. The second was a man of 43 years, born in Boston and never been out of New England he had a history of diarrhoea recurring at irregular intervals for twelve years. The third was a woman of 30 years, born in and never left Boston with a history of two years diarrhoea. In all three *E. histolytica* were abundant in the stools and all cleared up readily on emetine hydrochloride and carbazon and though watched for some time—up to a year—had had no recurrence.

The author then reviewed the hospital records since 1913 and found another twelve cases. Of the fifteen five had never been beyond New England, New York, Pennsylvania and New Brunswick. Of the rest two were infected in China, and one each in Ceylon, Colombia, Greece, Holland, Mesopotamia, Porto Rico, Texas and Virginia. CRAIG in 1936 estimated that 8-10 per cent of the population of the United States were infected with *E. histolytica* or its cysts and SHATTUCK found 2 per cent of stools of unselected patients in hospital were carriers of the parasite. It is important therefore to establish the diagnosis early to prevent spread of infection and it is noted that judging from the above records therapy on the usual lines is rapidly effective.

(111)

H. H. S.

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DESCHENS (R.) Rôle de la flore microbienne associée à l'amibe dysentérique dans l'étiologie de l'amibiase expérimentale. [Rôle of the Intestinal Flora in Inducing Experimental Amoebiasis].—*C R Soc Biol* 1937 Vol 125 No. 23 pp 1017-1020

The paper describes experiments designed to test the effect of inoculating cats with cultures of *E. histolytica* together with cultures of *Bact coli*. The inoculations were made into the lower end of the small intestine by means of laparotomy. Three series of cats were used, the first receiving amoebae culture together with *Bact coli*, the second the amoebae culture alone and the third only *Bact coli*. It was noted that in the first series there was a much higher rate of amoebic infection than in the second series while in the third series there were naturally no cases of amoebic infection but the large intestine in the majority of the animals revealed haemorrhagic areas and other signs of intestinal irritation. The action of *Bact coli* would appear to be responsible for the high amoebic infection rate in the first series. C M W

KELLOGG (Wilfred H.) & SCOTT (Elizabeth A.) The Laboratory Diagnosis of Amebiasis.—*Amer J Public Health* 1937 Aug Vol 27 No 8 pp. 813-816.

This article has been written as a warning to those who are inclined to diagnose the presence of *Entamoeba histolytica* without having had sufficient experience in this particular kind of investigation. It has been stimulated, doubtless by the recent popularity of amoebic infections in the United States and mentions a number of instances where serious and inexcusable mistakes have been made. The examination of fixed films stained by the iron haematoxylin method is considered the most reliable procedure but even this will not compensate for a lack of experience and a failure to comprehend the difficulties and pitfalls which confront those who plunge dogmatically and without justification into this type of work. C M W

REICHENOW (Eduard) Die Biologie der *Entamoeba histolytica* als Grundlage für die Pathogenese [The Biology of *E. histolytica* and its Pathogenicity].—*Arch f Schiffs u Trop Hyg* 1937 Feb Vol 41 No. 2 pp 257-262

In this article the author states his view regarding the pathogenicity of *E. histolytica*. He holds that this amoeba like all the other intestinal amoebae is normally an inhabitant of the lumen of the intestinal tract and not a tissue invader. Under certain conditions which occur especially in the tropics, these amoebae invade the intestinal wall and give rise to amoebic dysentery. The large tissue-invading forms of the amoeba have no part in the normal life-history of the organism, though they are capable of multiplying in the invaded tissues. The normal form is the so-called "minuta" form which lives in the intestinal lumen where it reproduces by binary fission and produces the characteristic cysts. This view gives a reasonable explanation of the known facts regarding healthy carriers, which are far more numerous than the cases with dysenteric symptoms. The author has estimated that such a healthy carrier may pass as many as thirty million cysts a day which must indicate the presence in the intestine of a much greater number of amoebae. It seems

highly improbable that this number of amoebae would be in the wall of the intestine without giving rise to symptoms. Such a carrier when he goes to the tropics may rapidly go down with amoebic dysentery owing to some change resulting from the climate and not from reinfection with another strain of amoebae. The view also does away with the necessity of assuming that there exists a non pathogenic amoeba *E. dispar* as distinct from a pathogenic one *E. histolytica*. C M W

POINDEXTER (Hildrus A.) Some Observations on the Effects of Environmental Changes on the Biology of *Endamoeba histolytica*—*Puerto Rico Jl of Public Health & Trop Med* 1937 Mar Vol. 12, No 3 pp 314-323 [22 refs.] [Spanish version pp 324-335]

By experiments on cats and dogs it was determined that culture amoebae containing much starch were less infective than amoebae from cultures without starch. The starch-containing amoebae are sluggish and less inclined to tissue invasion than the others. Animals fed on a diet rich in carbohydrate were less susceptible to amoebic infection than animals on a protein-rich diet. It was shown that cysts from dogs differed from those from human carriers in being more easily killed by external agencies. These cysts unlike those from human cases failed to produce infection when given to animals by the mouth. Similar delicate cysts can be obtained by rendering culture media less favourable to growth. It is concluded that the apparent resistance of the Porto Rican to amoebic infection is due in some degree to the rich carbohydrate diet. C M W

YAMAMOTO (Yoshio) Amoebic Dysentery V Cultivation of *Endamoeba histolytica* Third Report. Influence of Various Substances on the Growth of Dysenteric Amoeba.—*Jl Oriental Med* 1937 May Vol. 26 No 5 [In Japanese pp 937-968 [57 refs] English summary p 81]

The author has tested a number of media for the growth of *E. histolytica* and finds that those of Dobell and Laidlaw and of Tanabe and Chiba are the best. The addition of Vitamin B improves the growth as also do ovahormone haemoglobin and red blood corpuscles of the horse. C M W

STOVE (William S.) The Resistance of *Endamoeba histolytica* Cysts to Chlorine in Aqueous Solutions—*Amer Jl Trop Med* 1937 July Vol. 17 No 4 pp 539-551

The author has tested the action of chlorine in water on the cysts of *E. histolytica*. The viability or otherwise of the cysts has been determined by direct observation of the cysts the eosin test and cultivation. Furthermore the viability of accompanying *Bact coli* was also controlled. Recognizing that varying amounts of chlorine were fixed by the actual culture materials the residual free chlorine after mixture with the cyst suspension was taken into account. It was found as a result of these experiments that the cysts of *E. histolytica* were no more resistant to free chlorine than is *Bact coli*. C M W

DESCHIEUX (R.) Rôle de la flore microbienne associée à l'amibe dysentérique dans l'étiologie de l'amibiase expérimentale. [Rôle of the Intestinal Flora in Inducing Experimental Amoebiasis].—*C. R. Soc. Biol.* 1937 Vol. 125 No. 23 pp. 1017-1020

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IVANIĆ (Mornello) Ueber die in den Epithelzellen des menschlichen Enddarmes vorkommende parasitäre Zerstörungsarbeit und die damit verbundene multiple Teilung (Schizogonie) bei *Entamoeba histolytica* Schaudinn Multiple Division Stages of *Entamoeba histolytica* of a Destructive Character within Epithelial Cells of the Large Intestine. — *Zent f Bakt I* Abt Orig 1937 Jan 15 Vol 138 No 3/4 pp 263-272 With 16 figs

During the examination of the faeces of a case of amoebic dysentery the author noted the presence of small fragments of intestinal mucosa. He also remarked that within some of the cells of these fragments were varying numbers of small amoeboid organisms which had evidently arisen from certain multinucleate bodies. Though it is not clear from the paper how the connexion between these intracellular structures and the amoeba was determined it is concluded that they represent a process of intracellular multiplication by multiple segmentation of *Entamoeba histolytica*. As such a method of reproduction of *E. histolytica* has been seen by no other observer it is clear that confirmatory evidence of the author's claim is required. C M IV

BRUG (S. L.) Observations on *Dientamoeba fragilis* — *Amer Trop Med & Parasit* 1936 Dec 23 Vol 30 No 4 pp 441-452 [10 refs]

An examination of 80 asylum inmates in Holland for intestinal protozoa showed that 36 were infected with *Dientamoeba fragilis*. Culture of the amoeba is facilitated by the addition of small amounts of calcium carbonate to the medium. Cultures can be obtained from solid stools 6½ hours after passage and from liquid stools 13½ hours after. The amoeba is commonly present in solid stools. Culture will not take place at laboratory temperature a fact which tells against the view that this is a free living amoeba which may parasitize man. Culture fails if there are not sufficient bacteria in the medium. This may be assured by the use of a large inoculum in the first place or by the addition of bacteria from old media. In culture media inoculated with this amoeba there is a lag phase in which the number of amoebae falls before increase due to multiplication occurs. C M II

HAKANSSON (E. G.) *Dientamoeba fragilis* Some Further Observations — *Amer J Trop Med* 1937 May Vol 17 No 3 pp 349-362 [13 refs]

By the repeated examination of 38 inmates of an asylum during the course of one year it was determined that new infections with *Dientamoeba fragilis* occurred in 16 giving an annual infection rate of 42.1 per cent. Certain familial infections are recorded. It was noted that an infection may be present for a year and a half or it may terminate spontaneously after a longer or shorter period. The amoeba may be recognized apart from its morphological features by its characteristic behaviour when examined in water. There is first distension, followed by rupture of the ectoplasm and discharge of the contents and restoration of the ectoplasm to a spherical shell. In a number of cases carbazone 0.5 gm. twice daily for two days brought about eradication of an infection. C M II

- WENRICH (D H) *Studies on Dictyamoeba fragilis* (Protozoa) II Report of Unusual Morphology in One Case with Suggestions as to Pathogenicity.—*Jl Parasitology* 1937 Apr Vol 23 No 2 pp 183-186 With 32 figs. on 2 plates.

In a child in poor health it was found by stool examination that large numbers of *Dictyamoeba fragilis* were present. The blood showed an eosinophilia. The infection appeared to persist for some five years and was ultimately cured by vatrex whereupon the eosinophilia disappeared. In that period an operation for liver abscess was also performed but no microscopical examination was made then. At times the amoebae appeared abnormally large up to  $20\mu$  in diameter while the number of mononucleate forms varied from 27 to 90 per cent. It would seem that in this case there was reason to regard *Dictyamoeba fragilis* as pathogenic. C M II

- MELNEY (HENRY E) & FRYE (William W) *Practical Value and Significance of the Complement-Fixation Reaction in Amoebiasis*.—*Amer Jl Public Health* 1937 May Vol 27 No 5 pp 505-510 [15 refs]

The authors have tested the value of the complement fixation reaction in cases of amoebic infection in man monkeys and dogs and in monkeys and rabbits inoculated parenterally with amoebic extract. Experimentally infected dogs always gave a positive reaction as also the rabbits and monkeys inoculated with amoebic extract. Naturally and experimentally infected monkeys in most cases failed to give a positive reaction, owing no doubt to the failure of the amoebae to enter the tissues in these animals. In man a positive reaction is obtained in most cases but the occasional negative appears to indicate that the amoebae may sometimes inhabit the intestine without actually invading the tissues as is the rule with monkeys. In some cases of an obscure type a positive result was obtained and in these an antiamoebic treatment was distinctly beneficial. The test is of value after treatment for it becomes negative if the infection has been completely eradicated. C M IV

- CRAIG (Charles F) *Observations upon the Practical Value of the Complement-Fixation Test in the Diagnosis of Amoebiasis*.—*Amer Jl Public Health* 1937 July Vol 27 No 7 pp 689-693 [16 refs.]

In this paper the author notes that he has practised the complement fixation test for over eight years and has applied it to more than 1,500 cases. Positive results were obtained in 18 per cent of these cases and of these 175 were submitted to stool examination with the result that amoebae were found in 157. Of 825 which gave a negative complement fixation test only twelve showed amoebae on microscopic examination. It is evident that this test for amoebic infection is of considerable value and is applicable to the diagnosis of obscure conditions and to the detection of carriers in surveys. The various uses of the test and its significance are discussed in the paper. C M IV



DESCHIENS (R.) Considérations sur l'action pathogène d'une souche d'amibes dysentériques (Souche C. Dobell D.K.B.) [Pathogenicity of the Dysentery Amoeba Strain C. Dobell, D.K.B.]—*Bull Soc Path Exot* 1937 July 7 Vol. 30 No. 7 pp 562-564

The author describes experiments which he carried out with a culture strain of *E. histolytica* of human origin which had been given him by DOBELL, who had maintained the strain in culture for 12 years. After six years of culture the conditions were changed by the addition to the culture of other bacteria than those present with a view to encouraging the amoebae to produce cysts, which hitherto they had failed to do. After a further six years of culture the strain was given to the author who tested its pathogenicity to kittens by inoculating directly into the terminal part of the small intestine. Of 18 animals thus inoculated 15 acquired acute amoebic dysentery. During the first six years of culture the amoebae had failed to produce dysentery but the culture had then been injected *per rectum* and not into the small intestine. The author though admitting this difference wonders whether the change in bacteria in the culture had been the means of increasing the pathogenicity of the amoebae. C M W

PATIRO MAYER (Candido) & PATIRO (Francisco A.) Hepatitis crónica y brotes agudos con ictericia, por amebiasis [Chronic Hepatitis with Acute Exacerbation and Jaundice associated with Amoebae.]—*Prensa Med Argentina* 1937 Nov 10 Vol. 24 No. 45 pp 2139-2154 [28 refs]

The case described is that of an Italian, aged 27 years who suffered for four years on and off from acute attacks of enlargement of the liver with jaundice but in the intervals was apparently in good health. He also exhibited certain complications at one time bronchial at another pneumonia and pleurisy with serofibrinous exudate. The attacks of hepatitis yielded to emetine. Repeated examination of the faeces failed to discover any entamoebae. The author holds that amoebic hepatitis may occur as simple congestion, or as a necrotic and suppurating process, acute or chronic or as a cirrhotic condition. Amoebic hepatitis with jaundice but not cachexia is not common. The jaundice he ascribes to "amoebic hepatosis," occurring in a liver whose tissue is already reduced in resistance to it may be extraneous organisms or less often, to pressure on the intrahepatic canals.

H H S

SANVER (L.) & DESTRIEATS Sur un cas d'abcès amibiens multiples du foye [Multiple Amoebic Abscess of the Liver]—*Bull Soc Path Exot* 1938 Apr 6 Vol. 31 No. 4 pp 319-322. With 1 fig

The patient was a soldier who though not feeling very well, had played football four days before coming to hospital. He had a temperature of 37.9°C slight icteric tinge some enlargement of the liver to two fingers-breadths below the right costal margin [the upper limit is not stated] with tenderness but not marked pain. In ten days he had 84 ggm. of emetine which eased the tenderness without reducing the size of the liver. Three weeks later his temperature which had been in the neighbourhood of 37°C rose to 38° and over and rales

were audible at the right base behind. Abdominal distention was thought to indicate a subphrenic abscess. At operation pus was obtained from the liver. Three days later signs of peritonitis appeared and the patient died. At autopsy three abscesses were found in the right lobe of the liver and one the largest and not that which had been found at operation had ruptured. There is no mention of any previous dysentery nor beyond the fact that organisms were not found in the pus is there any proof that the abscesses were amoebic in origin. Amoebae were not seen in the pus they were not looked for in the walls of the abscesses

H H S

PALMER (Rex B.) Changes in the Liver in Amebic Dysentery with Special Reference to the Origin of Amebic Abscess.—*Arch Pathology* 1938 Mar Vol 25 No 3 pp 327-335 With 2 figs

MELENEY (Henry E.) & FRYE (William W.) The Effect of Direct Animal Passage on the Pathogenicity of *Entamoeba histolytica* for Kittens.—*Amer J Hyg* 1937 Mar Vol 25 No 2 pp 313-326 (10 refs.)

Two strains of *Entamoeba histolytica* which had been maintained in culture for some time were found to differ considerably in their pathogenicity for kittens. Both strains were passed through seven dogs (rectal inoculations) and then inoculated to kittens. Both strains were found to have an increased pathogenicity for kittens but, as before one was more pathogenic than the other. Passed into culture again the first passage showed a fall in pathogenicity which was however higher than that of the original cultures. The original degree of pathogenicity was regained after a year's cultivation. It is concluded that the increased pathogenicity resulting from animal passages is due to the better conditions of nourishment found in the animal intestine as compared with those in culture media. C M W

HINMAN (E. Harold) & KAMPMEIER (R. H.) Clinical Intestinal Amebiasis. A Study of 400 Cases from Charity Hospital at New Orleans.—*Amer J Trop Med* 1937 Mar Vol 17 No 2 pp 263-278 With 1 map

As the title states the paper gives the details of a clinical study of 400 cases of intestinal amoebiasis which were admitted to hospital for symptoms referable to the amoebic infection. Practically the entire group represents the diarrhoeic and dysenteric stage rather than the carrier form of the disease. The cases are carefully analysed from the point of view of race age sex, locality of infection temperature pain, mortality incidence of liver abscess and so on. Those interested in such details must consult the paper in the original. C M W

PURCELL (F. M.) A Case of Amoebic Hepatic Abscess and Associated Pericarditis.—*Trans Roy Soc Trop Med. & Hyg* 1938 Apr 20 Vol 31 No 6 pp 689-690

VILLO (Flavio L.) Amebiasis intestinal ulceró-necrótica y tumor amebiano del ciego y colon ascendente [Ultero-necrotic Intestinal Amoebiasis and Amoebic Tumour of the Caecum and Ascending Colon].—*9a Reunión Soc Argentina Patol Regional Mendoza* 1 2 3 y 4 octubre 1935 Vol. 2 pp 813-843 With 23 figs. (3 coloured) & 1 chart [23 refs]

The paper describes in detail the case of a man who suffering from amoebiasis, developed a tumour termed a tuberculoma of the caecum and ascending colon. This was removed by operation from which the patient did not recover. Histological examination of the tumour revealed a heavy amoebic infection which extended also to other parts of the large intestine

C M W

MOHAMAD Door amoeben veroorzaakte perforatie van de appendix. [Amoebiasis and Perforated Appendix].—*Geneesk Tijdschr v Nederl Indië* 1937 Sept 7 Vol 77 No. 36 pp. 2171-2174 With 1 plate English summary (3 lines)

A Chinese adult, 31 years of age living in Surabaya was seized with acute abdominal pain after a week of symptoms pointing to appendicitis. Ruptured appendix was diagnosed and operation performed. An abscess was found and the appendix was perforated. The patient did not survive. Examination of the appendix revealed numerous *E. histolytica* in the borders of the perforation

H H S

HUARD (P.) Les localisations chirurgicales extraintestinales lombaines de l'amibiose (foie excepté) [Extraintestinal Surgical Amoebiasis elsewhere than in the Liver].—*Bull Soc Méd Chirug Indochine* 1937 Apr Vol 15 No 4 pp 327-355 [Refs in footnotes]

In this long paper the author reviews the records which have been made of amoebiasis of parts of the body other than the intestine and the liver. These include the lungs and pleura, the brain, the spleen, the urinary and genital systems, lymphatic glands and the skin. Certain records are discussed as unreliable but others are accepted as probably correct. The general conclusion is that in all these situations amoebae may occur as direct extensions from the intestine or liver or as metastases from these primary foci

C M W

BISOGNI (G.) Le localizzazioni rare della amebiasi [Amoebiasis in Unusual Situations].—*Giorn Ital di Clin Trop* 1937 Apr 30 Vol 1 N. S. No 4 pp 113-115

An article calling attention to the possibility of invasion of the liver, lungs and brain by *Entamoeba histolytica* with remarks on the symptoms

C M W

WESTPHAL (Albert) Betrachtungen und experimentelle Untersuchungen zur Virulenz der *Entamoeba histolytica* beim Menschen. [Virulence of *E. histolytica* in Man].—*Arch f Schiff- u Trop Hyg* 1937 Feb Vol 41 No 2 pp 262-279 With 2 figs. [48 refs]

The author describes an experiment in which an individual acquired a harmless *E. histolytica* infection (carrier condition) by the ingestion

of cysts from a case of acute amoebic dysentery. Some months later the harmless infection persisting cultures of bacteria isolated from the faeces of a case of acute amoebic dysentery were ingested by the healthy carrier and a control. Both the carrier and the control suffered from diarrhoea the former in three days and the latter in ten days. On the 23rd day the carrier experienced an attack of acute amoebic dysentery. After an interval of freedom from symptoms a relapse occurred and it was possible to demonstrate that this amoebic dysenteric attack was associated with a Flexner V infection. It would seem that a bacterial background may, as in the case described, be the determining factor in rendering *E. histolytica* pathogenic as distinct from producing the carrier condition. Whether this is a general rule or not future investigations alone will show but it is a theory which seems worthy of consideration. It is pointed out that in the case of the well known Chicago outbreak of amoebic dysentery the dysenteric symptoms in certain cases occurred within two days of exposure to the contaminated water supply a state of affairs which suggests that a bacterial infection was acting upon individuals who were already carriers of *E. histolytica*. C M IV

YOKOYAMA (T) *Mixed Infection of Bacillus Dysenteriae and Dysentery Amoebae.*—*Jl Oriental Med* 1937 Mar Vol 26 No 3 [In Japanese pp 497-502 With 1 fig English summary p 42.]

During the study of 153 cases of bacillary dysentery in Manchuria the author has noted that in 7 cases as the bacillary dysentery condition subsided and when dysentery bacilli could no longer be detected amoebae of the vegetative type appeared. It is concluded that these were cases of bacillary dysentery superimposed on a carrier condition of dysentery amoebae. C M IV

SGROJ (Diego) *Considerazioni su di un caso di intolleranza e di ipersensibilità secondaria all'emetina ed ai pentarsoli.* [A Case of Intolerance and Hypersensitivity to Emetine and Arsenio].—*Riv Sanitaria Siciliana* 1937 Aug 1 Vol. 25 No 15 pp 885-887

The patient a woman of 38 years two years before suffered from amoebic dysentery and was treated with emetine 6 cgm daily for 10 days followed by stovarsol in doses of 75 cgm. daily 3 tablets each of 25 cgm. for ten days. Great improvement resulted pain ceased the diarrhoea lessened tenesmus disappeared and the general state became better. A month later the symptoms returned and similar treatment again resulted in benefit. Fluctuations in her condition occurred for the next two years when she again came under observation and *E. histolytica* was seen in the faeces. She was given cachets containing amoebarsen two daily each containing 25 cgm after 12 days she showed symptoms of poisoning—marked weakness hyperaesthesia diminished reflexes vomiting slow pulse (48) abdominal pains and diarrhoea. The drug was stopped and stimulants—camphor adrenalin glucose etc—given and improvement followed in three days. Later emetine hydrochloride 3 cgm was given and twelve hours later the patient exhibited cardiac weakness small pulse 66 per minute (she had had 25 drops of Tr digitalis) low arterial tension and marked asthenia. The author concludes that it is

a mistake to treat patients with amoebiasis by repeated small doses of emetine or arsenicals to avoid hypersensitivity adequately large doses should be given to cure when beginning treatment. H H S

GIRGES (Rames) The Treatment of Entamoebiasis and Other Intestinal Troubles with Iodochloroxyquinolin (Entero-Vioform) — *Jl Egyptian Med Assoc* 1937 Apr Vol. 20 No 4 pp 154-166 [18 refs]

The paper gives an account of the treatment of intestinal amoebiasis both the acute and chronic form, by means of entero-vioform which is sold in the form of tablets each containing 0.25 gm of iodochloroxyquinolin and sufficient sapamine (sulphomethylate of p-stearyl aminophenyl-trimethyl ammonium) to help in emulsifying and distributing the active principle in the lumen and on the walls of the intestine. The author states that during the past eighteen months he has treated 279 cases. Acute cases were given orally after the chief meals for a period of seven to ten days three to four tablets of the drug a day. Sometimes the course was repeated after an interval of a week or ten days. In chronic carrier cases, in addition to the oral treatment rectal enemata are given each night. Each consists of 150-200 cc of warm water in which are crushed two to eight tablets. In each course eight to twelve enemata were given the dose of drug being increased during the course. Cases of definitely diagnosed bacillary dysentery as well as other cases of intestinal disturbance were benefited by oral administration of the drug. The conclusion is that enterovioform is the drug *par excellence* for entamoebic dysentery the margin between the therapeutic and toxic doses being very great. It is especially useful in cardiac cases in which emetin is contraindicated, and in chronic carrier or emetin-resistant cases. C M W

IZAR (Guido) SCUDERI (Francesco) LENZI (Franco) Studi sull'amebarsene. Nota I. Azione su soggetti sani [IZAR & SCUDERI] [Amoebarsen. Its Action on Healthy Subjects and in Cases of Chronic Intestinal Amoebiasis].—*Boll Istituto Sieroterap Milanese* 1938 Jan Vol 17 No. 1 pp 1-10 German summary (5 lines). Nota II. Azione terapeutica nella amebiasi intestinale cronica [IZAR & LENZI].—*Ibid* pp 11-15 German summary (4 lines)

The authors studied the effects of ordinary therapeutic doses of amoebarsen [the formula of this is not given] 0.75 gm daily in 3 doses of 0.25 gm by mouth or 0.5 gm in two doses of 0.25 gm. and by daily enema of 1 gm in 100 cc of 2 per cent bicarbonate of sodium noting the effects on the urine the corpuscle counts van den Berg reaction and blood pressure. They concluded that it produced no lesions of the internal organs that the drug was well tolerated and was haemopoietic.

For treatment of patients the authors gave to adults 30 capsules of 22.5 cgm in 15 days some could tolerate three capsules daily children from 8-10 years were given one a day for 10 days. By enema the maximum dose was 1 gm given as stated above in 100 cc. of 2 per cent NaHCO<sub>3</sub> for 10 days, more usually for 7 days only. Sixty patients were treated, but it would appear from the summary of results that emetine was also given. The authors state that in 52 the faeces

showed no amoebae after the second course of emetine and amebarsene but in 7 of them the amoebae and cysts reappeared. The other eight were chronic patients who had been ill for a long time the amoebae disappeared from them after the third course. None showed any signs of intolerance. No details of the cases treated are given.

H H S

RADNA (R.) Sur le traitement de l'amibiase intestinale par l'iodoforme. [Treatment of Intestinal Amoebiasis with Iodoform].—*Ann Soc Belge de Méd Trop* 1938. Mar 31 Vol. 18 No 1 pp 81-83

Iodoform for treatment of amoebic colitis was advocated by CASTELLANI in 1935 [see this *Bulletin* 1936 Vol. 33 p 546 and 1937 Vol. 34 p 956]. The author records the results of similar treatment in eleven cases of amoebic dysentery and in four cyst-passers. The dosage is as follows: 1st day a keratin capsule containing 5 cgm. 2nd day two capsules 3rd day four 4th day onwards six capsules. The course is from 15 to 22 days. Re-examined 15 days later all were negative as they were also after a month. Examination during the ensuing six months revealed one relapse after four months but this patient lived in a district where the disease was common and he may have been reinfected. In the cyst passers no cysts were found in the stools after 12-16 days. [The length of time that these have remained negative is not stated.]

H H S

BHATTACHARJEE (Jagdish C.) Treatment of Intestinal Amoebiasis. (Recent Views on the Use of Amoebicidal Drugs).—*Med Bull Bombay* 1937 June 19 Vol. 5 No 12. pp 374-378 [12 refs.]

This is a general account of intestinal amoebiasis and the method of administration of the various drugs which have been employed for its treatment.

C M W

MEYER (Walter) Die amöbicide Wirkung organischer Säuren biologischer Herkunft. [Amoebicidal Action of Biological Organic Acids].—*Zent f Bakt I Abt Orig* 1937 Aug 10 Vol. 139 No 7 pp 382-396 [20 refs.]

The author notes that when animals are inoculated with *E. histolytica* only about 25 per cent. become infected. This is due either to specific resistance or to the nature of the intestinal contents. The latter possibility led him to investigate the action of certain fermentation acids on the amoeba by means of the inverted cover glass method of cultivation. Acids in descending order of amoebicidal activity could be arranged as follows—lactic tartaric acetic butyric succinic citric and malic. This activity appears to be due solely to the negative ion of the acids and not to pH variations against which special precautions were taken. It is thought that the results might afford some indications for therapeutic measures.

C M W

- EPSTEIN (G W) & AWAKIAN (A.) Studies on the Intestinal Protozoa of Rats. I. Rats as Carriers of Dysenteric Entamoebae.—*Trans Roy Soc Trop Med & Hyg* 1937 June 25 Vol. 31 No 1 pp 87-92 With 8 figs on 1 plate.
- AWAKIAN (A) Studies on the Intestinal Protozoa of Rats. II. Rats as Carriers of Balantidium.—*Ibid* pp 93-98. With 5 figs on 1 plate [10 refs]

In these two papers are described the discovery of *Entamoeba histolytica* and *Balantidium coli* in wild rats caught in Moscow and the steps which were taken by culture and inoculation to prove that the amoeba and ciliate were actually the species they resembled.

C M IF

- VIRNICH (A) Ueber Darmflagellaten in Shanghai. [Intestinal Flagellates in Shanghai].—*Arch f Schiffs- u Trop Hyg* 1937 Feb. Vol 41 No 2 pp 283-295 With 10 figs. [28 refs]

The author has observed one hundred and three cases of intestinal flagellate infection in Shanghai due to *Trichomonas Chilomastix* or *Lamblia*. The conclusion is that all may be pathogenic, *Trichomonas* being the least and *Lamblia* the most. The symptoms of the cases are discussed as also the treatment which admittedly has not been very satisfactory. The best results appear to have been obtained with intramuscular injections of solu-salvarsan.

C M IF

- SPANGENBERG (J J) MUNIST (L) & ARDAIZ (A) Consideraciones acerca de la localización habitual de las giardias en el tubo digestivo [Usual Situation of Giardia in the Digestive Tract].—*Arch. Argentinos Enferm Aparato Digest y Nutric* Buenos Aires 1937 Apr-May Vol 12 No 4 pp 372-381

A patient with symptoms of cholecystitis was found to have large numbers of *Lamblia* in the liquid withdrawn by duodenal tube. The gall bladder was removed by operation and the patient made a good recovery. Careful examination of the contents of the gall bladder and the walls by serial sections failed to reveal any flagellates which, however could still be obtained in abundance by tubeage of the duodenum. It seems evident therefore that the presence of *Lamblia* in fluid withdrawn from the duodenum, even in cases suffering from symptoms referable to the gall bladder is no indication that they occur in this organ. Such observations as those recorded in this paper are of the greatest importance at the present time when there is an increasing tendency on the part of clinicians who have had little experience of parasitology to ascribe to *Lamblia* infections all manner of symptoms and syndromes and to assume without any evidence whatever that the flagellates enter the bile duct, gall bladder and the higher biliary passages.

C M IF

- MORENAS (L) Lambiose biliaire vomissements périodiques et troubles nerveux. [*Lamblia* Infection causing Vomiting and Nervous Symptoms].—*Bull et Mém Soc Méd Hôpiti de Paris* 1937 Feb 22 53rd Year 3rd Ser No 6 pp 231-236

The paper describes in detail the case of a man 33 years of age who suffered from periodic attacks of vomiting followed by diarrhoea and

associated with various nervous symptoms including asthenia wasting polyneuritis of the lower limbs and some pigmentation of the skin. Though there were indications of hereditary syphilis it is concluded that the actual cause of the trouble was a *Lamblia* infection which proved very resistant to treatment. C M IV

ENAULT (M) Un cas de colite à *Giardia* Traitement créno-médicamenteux. Résultat [A Case of Lamblial Colitis Spa and Drug Treatment.]—*Bull Soc Path Exot* 1937 May 12. Vol 30 No 5 pp 379-381

The case described is that of a woman 50 years of age who amongst other complaints suffered from a chronic gastro-enteritis which was associated with a *Lamblia* infection. The flagellate infection appears to have been eradicated by the administration of a number of drugs of which bismuth subnitrate in large doses seems to have been the chief. C M IV

ECHENMENDIA (José) La lambliasis importancia y concepto actual del tratamiento [Modern Treatment of Lambliasis]—*Rev Parasit Clin y Lab* Habana 1936 July-Aug Vol. 2. No 4 pp 611-619

The article is a general account of the condition which is becoming known as lambliasis in which many and varied symptoms are attributed to the presence of the flagellate in the intestine. It is said to be one of the most important causes of infantile gastro-enteritis. The author still clings to the notion that the organisms may invade the biliary system in spite of the fact that no satisfactory evidence of their ever spreading there from the duodenum has been obtained. A number of remedies for the treatment of the condition are discussed. C M IV

MARTIN (Pierre) Nouveau traitement de la lamblase par un dérivé d'acridine [New Treatment of *Lamblia* Infection by a Derivative of Acridine]—*Rev Méd et Hyg Trop* 1937 Jan-Feb Vol. 29 No 1 pp 33-36

— Sur un nouveau traitement de la lamblase [New Treatment of *Lamblia* Infection.]—*Marseille Méd* 1937 Apr 5 Vol. 74 No 10 pp 392-394

The author claims that atebryn or the French equivalent quinacrine in the doses employed for the treatment of malaria will rid the majority of cases of lambliasis of their flagellates. In a few cases it may be necessary to repeat the course once or twice. Though the infection responds to both oral and subcutaneous administration of the drug the author prefers to give it by the mouth. C M IV

IRAZABAL LUIGUI Etudes expérimentales sur le traitement de la lamblase. [Experimental Treatment of *Lamblia* Infection]—*Ann Parasit Humains et Comparés* 1937 Jan 1 Vol. 15 No 1 pp 29-45 [37 refs.]

The paper describes attempts which were made to rid mice of a naturally occurring *Lamblia* infection by the administration of various



drugs. The best results were obtained with an emulsion of turpentine which, however, is not regarded by the author as a specific remedy

C M W

BRUMPT (Lucien) Traitement expérimental de la lamblase. [Experimental Treatment of *Lambliæ* Infection.]—*C. R. Soc. Biol.* 1937 Vol. 124 No. 11 pp. 1040-1042.

Carefully conducted experiments on *Lambliæ*-infected mice have shown that of all the treatments tested oral administration of a 1 per cent. solution of "quinacrine" for five days alone was able to bring about a cure which was obtained in 80 per cent. of the animals to which it was administered

C M W

CALLENDER (Geo. R.) & INMOX (Ebner H.) Diarrhea, Enteritis, and Dysentery—Reprinted from *Army Med. Bull.* Ancon, Canal Zone. 1937 July pp. 24-75 With 2 figs. [31 refs.]

WOLFF (J. W.) Dysenterie Soemo ter Oostkust van Sumatra. Bijdrage tot de epidemiologie der bacillaire dysenterie. [Bacillary Dysentery on the East Coast of Sumatra.]—*Geneesk. Tijdschr. v. Nederl. Indië* 1938 Apr. 5 Vol. 78 No. 14 pp. 762-780 With 5 graphs [59 refs.] English summary

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## HELMINTHIASIS

PÉTRASSOV (V F) & ALEXÉIEV (K.) Cours de l'invasion par les helminthes parmi différents groupes de la population dans quelques villes de la région industrielle d'Ivanovo de 1925-1934 [Varying Incidence of Helmintho Infections of Different Groups in the Industrial Area of Ivanovo]—*Med Parasit & Parasitic Dis* Moscow 1937 Vol. 6 No 3 [In Russian pp 378-388 With 5 charts. French summary p 388]

The varying percentage of intestinal helminthiasis, as detected by a method unstated in the summary is given over 10 years or less.

Total detected infections were 43.5 in 1927 33.7 in 1928 and 34.2 in 1932. For school-children they fell from 75.8 in 1925 to 43.0 in 1934 for the non-organized population from 32.5 in 1929 to 15.0 in 1933 for organized adults (workers in the food industry) from 37.2 in 1930 to 27.2 in 1933

Clayton Lane

KOURI (Pedro) BASNUEVO (José G.) & CALVO FONSECA (Rafael) Porcentaje y distribución geográfica del parasitismo intestinal en Cuba. [Prevalence and Geographical Distribution of Intestinal Parasites in Cuba.]—*Rev Med Trop y Parasit* Habana. 1937 Nov-Dec Vol. 3 No 6. pp 481-496 497-508 509-513

This series of three papers deals with the intestinal parasites found in various districts but the number of persons examined in any one district is too small to allow of any inference of value. In Pedro Betancourt 103 were subjected to faecal examination helminthic infestation—*Trichuris* *Ascaris* and *Necator*—was found in 46 (44.6 per cent.) and another 13 (12.6 per cent.) had protozoa also—*E. coli* and *Giardia*. In Unión de Reyes 93 were examined and 51 (54.8 per cent.) were infested. In Jagüey Grande 155 examinations revealed 71 (61.8) positive. Several other districts were investigated but the numbers were so few that no useful purpose would be served by quoting them. In the Province of Matanzas altogether in twenty-one districts a total of 1,391 was examined and 956 or 68.7 per cent. were parasitized. The detailed findings are presented in tables.

H H S

CRENK (R.) Le parasitisme intestinal et ses conséquences dans la région de Bourail (Nouvelle-Calédonie) [Intestinal Parasitism and its Results in New Caledonia.]—*Marseille Méd* 1937 Nov 5-15 Vol 74 No 31-32. pp 424-430

The discovered incidence of intestinal infection here mostly with ankylostomes, lay between 74.7 and 100 the essential symptom is colitis and the treatment Manson's mixture for worms and bismuth and other remedies for the intestinal discomfort.

The number of persons examined, presumably by smear was 426 the infections detected were 320 with hookworms 50 with trichuris 53 with lamblia 29 with strongyloides and 5 with such as *ascaris* and *taenia*. The abdominal pain is along the ascending colon Faeces are simply deposited on the soil.

C L

- CHEN (H T) Parasites in Slaughter Houses in Canton. Part III. Trematodes and Cestodes Parasite in the Alimentary Tract of Buffaloes.—*Lingnan Sci J*. 1937 Vol. 16 No 4 pp. 583-590 With 4 figs [14 refs]

The six parasites from buffaloes here considered include *Eurytrema pancreaticum* (Janson, 1889) which has been reported from man. A description is given and *Eu codomaticum* (Giard and Billet 1892) is held to be a synonym C L

- TUBANGUI (MARCO A) & MASILUNGAN (Victoria A.) Studies on the Cercarial Property of the Sera of Vertebrate Animals.—*Philippine J Sci* 1936 Aug Vol. 60 No 4 pp. 393-396.

Tests were made to determine the cercaricidal property of the sera of different kinds of vertebrates against two species of larval trematodes namely the cercaria of *Schistosoma japonicum* and of *C matsumensis* Tubangu, 1923 All the sera tested, except those of the cat and the rabbit, possessed marked cercaricidal action against the cercaria of *Schistosoma japonicum* On *C matsumensis* the effect was only partial.

The cercaricidal titers of the different sera against the cercaria of *Schistosoma japonicum* varied within appreciably wide limits. The titers of the sera of man, guinea pig and other warm-blooded vertebrates which are known to serve as favourable hosts to the adult parasite were found to be uniformly low while those of the sera of cold-blooded vertebrates that are not susceptible to the parasite were much higher.

The cercaricidal (cercarolytic) bacterolytic, haemolytic, and other cytolytic properties of the blood are probably analogous phenomena due to the union of the corresponding antigens with antibodies of the third order and complement. The fresh normal sera of the cat and the rabbit possess no cercaricidal property due probably to a deficiency in both amboceptor and complement.

The cercaricidal titer of the serum of a guinea pig infected with *Schistosoma japonicum* was found to be much higher than that of the serum of a normal animal belonging to the same species, due apparently to an increase in the amboceptor content of the blood as a result of the infection.

C L

- BUCHANAN (R M) A Comparative Study on Schistosomiasis in the Berber Region of the Anglo-Egyptian Sudan.—*J Helminthology* 1937 Dec Vol 15 No 4 pp 183-202 With 4 figs [37 refs]

Success in the elimination of Schistosomiasis will only be achieved by elimination of the intermediate host in short the key to the problem as a whole is sanitation not medication.

Irrigation in this Province is of three kinds. Waterwheels (Sagia) drawing from river or well, a counter-balanced bucket on a beam (Shaddoof) or a mechanically driven pump. In the case of the first two the water as drawn runs rapidly along the narrow channels and since no more is put into them by man or animal power than is really needed they dry between waterings so that Buchanan has never seen snails in Sagia ditches. With pumping, the tendency is to over-water leaving a sluggish current the water being used for all domestic purposes and since the pump delivers snails into the canals (indeed the river silt may be composed of mirlads of miniature snails) the vicious circle in human infection and the repopulation by snails of

irrigation channels carefully cleared are both assured. A seasonal variation in vesical disease is seemingly related to pools and stagnant creeks left by the falling Nile or to lowered resistance from seasonal overwork malaria or underfeeding. Although *S. haematobium* and *S. mansoni* may both be present in a single agricultural scheme in this Province in only two cases both young men have the ova of the two species been found in the same faeces. The influx of snails is from the river and main canal though conditions for multiplication are optimal in the terminal canals. A sufficient distinction is not always drawn between infestation of river and canals with snails and infection of these localities with Bilharzia. Where infection with *S. mansoni* is present percentage infection figures have been 35.1 and 55 whereas of 2,590 examined for *S. haematobium* the infection percentage was 3.4. Urinary bilharziasis is primarily a disease of children and few infections were found in those over 25 years old. Infection with *S. mansoni* increases with age and the number of eggs in a faecal smear is not related to the severity of symptoms. Although albuminuria may be present without blood or ova Buchanan has never found ova without concomitant albuminuria. In prevention the first essential is held to be the provision of wells the second the finding of a suitable type of latrine. Great importance is laid on propaganda. Details are given of methods directed against snails in canals. C. L.

DOWDESWELL (R. M.) Schistosomiasis in the Kavirondo District of Kenya Colony—*Trans Roy Soc Trop Med & Hyg* 1938 Apr 20 Vol 31 No 6 pp 673-688 With 2 text figs & 2 figs. on 1 plate [65 refs.]

It is concluded that *Physopsis nasuta* is an intermediate host of *Schistosoma bovis* in Central Kavirondo and that *Ph. nasuta* or *Bulinus forskalii* or both act as such for *S. haematobium*.

Central Kavirondo lies to the north of the gulf of the same name in Lake Victoria. urinary schistosomiasis is strictly limited to a small strip of land 20 miles long and 4 miles wide on the northern shore of the gulf and rising a few hundred feet from the lake level of 3 700 feet. Examination of the urine of all the 123 children showed schistosome eggs in 88 and red cells in 17 more so that some 85 per cent are infected. Of the snails identified by Major CONOLLY the only one emitting furcocercariae was *Ph. nasuta*. Water containing such cercariae got from wild snails was placed in contact with the shaved skin of 5 rabbits. 4 showed no infection when later examined in the fifth were found 2 males 2 females and 2 immature males. They were identified by Professor LEIPER as *S. bovis* one female having in its uterus typical *S. bovis* ova while the other had several eggs with *S. haematobium* outlines and one typical *S. bovis* egg. Again Even the adult *Schistosoma bovis* can be confused with *S. haematobium* unless a careful examination is made. for apart perhaps from the extent of the vitelline glands the shape of the ova is the only very distinctive difference. And once more. No animal schistosomiasis has been reported in Central Kavirondo and in the whole of Kenya only two cases occurring in bullocks in the neighbourhood of Nairobi have been seen by Mr R. DAUBNEY of the Veterinary Research Laboratory.

Cases of *S. mansoni* infection (intestinal) have been seen in another area of Central Kavirondo in natives, who state that they have never left (1163)

the district and it seems likely that *P. stanleyi* Smith is the intermediate host here. A careful survey of the small distribution in the Colony would be of great value in assisting to elucidate the factors involved in the distribution of the disease as well as the vectors concerned, and an investigation of animal schistosomiasis would also be of great interest."

[Such a small survey comparing species within and outside the endemic areas of infections, should prove a valuable guide to infection studies.] C. L.

SCOTT (J. Allen) The Regularity of Egg Output of Helminth Infestations, with Special Reference to *Schistosoma mansoni*.—*Amer. J. Hyg.* 1938. Jan. Vol. 27 No. 1 pp. 155-175 [18 refs.]

The author's summary is as follows:—

Dilution egg counts were made on all stools passed during a 30-day period by three Egyptian peasants harbouring the hookworm *Ancylostoma duodenale* and the blood fluke *Schistosoma mansoni*. Similar determinations were made on four or five consecutive stools passed by each of 87 other persons harbouring one or both of these worms. It was shown that the hookworm egg output of these cases was no more variable than that of other cases reported in the literature. Furthermore, the output of eggs of *S. mansoni* was no more variable than that of hookworms in the same cases. It would seem that as far as the variability of egg output is concerned, it is justifiable to use the dilution egg count method for studies of infestations of *S. mansoni* similar to those successfully carried out with hookworm infestations. Analysis of data presented here and of those available in the literature indicates that egg output of all species so far studied is less variable when expressed in terms of eggs per cc. of stool than in terms of eggs per unit of time. The implications of the latter conclusion permit considerable simplification in the methods of presenting benthic egg count data."

To those who wish to know what value egg counts have in estimating the weight of infection in a particular patient a knowledge of the following details of this work is essential. The method of egg counting was that of STOLL, and the figures all apply to the number of eggs in 1 cc. of stool. In Case A those of *Ancylostoma duodenale* varied between 1,167 and 0 of *S. mansoni* between 2,867 and 267. In the same two consecutive stools the eggs of the former were 1,167 and 167 and of the latter 1,367 and 2,500. In the stool in which the fluke eggs were 2,867 the maximum, the hookworm eggs were 133 and were lower twice only, namely 67 and 0. In Case B hookworm eggs varied between 1,833 and 233 those of the fluke between 2,067 and 300 and when schistosome eggs were highest (2,067) those of the hookworm were 467. In Case C the parallelism of the egg discovery from the two species was closer: the maximum of 11,867 for hookworms going with a near maximum of 1,400 for the fluke, the actual maximum being 1,433 yet the minima were 2,233 and 233. C. L.

DE MELLO (Indalecio Froilano) Sur les mollusques indiens pouvant servir d'hôtes éventuels dans la transmission de la bilharziose urinaire [Indian Molluscs which are Possible Transmitters of Urinary Schistosomiasis].—Reprinted from C. R. XIIIe Congrès Internat. Zool. Lisbonne 1935 pp. 2084-2095 [29 refs.]

On Indian molluscs which can transmit bilharziasis. A child of an African soldier by a Hindu mother was brought to hospital with

dysentery and haematuria and examination showed eggs of *S. haematobium* both in faeces and urine and on their right identification de Mello has no doubt at all or that an autochthonous case of this infection has been established at Valpo. Among the molluscs found there was *Melanooides tuberculatus* which GORSKI [this Bulletin 1933 Vol. 30 p. 208] believed to be the larval host in the Lower Shire District. Again *Limnaea luteola pinguis* has attracted these miracidia with some penetration so that further studies are called for. C. L.

WU (Huang) Cattle as Reservoir Hosts of *Schistosoma japonicum* in China.—*Amer. J. Hyg.* 1938 Mar. Vol. 27 No. 2. pp. 290-297. With 2 text figs. & 4 figs. on 2 plates. [34 refs.]

The first quantitative study of the incidence of schistosomiasis in cattle (oxen and water buffaloes) at Shanghai. Small portions of liver were taken from cattle killed in municipal slaughter houses between December 1936 and May 1937. The numbers examined and the percentages found infected month by month were for oxen 50 and 26 29 and 34 4 98 and 18 3 56 and 10 7 118 and 0 84 48 and 4 2 total and average 399 and 12.6 for buffaloes 15 and 18 3 100 and 20 53 and 20 7 113 and 24 2 123 and 13 8 12 and 8 3 total and average 416 and 18 7. Infection was proved by digesting liver portions in 10 per cent caustic soda solution at 37°C for 24 hours and searching the sediment for eggs. Faeces and liver could never be got from the same beast these last generally came from the Chekiang Province where man is heavily infected. Sections from the liver show a ray like structure round eggs like that seen by HOEPFLI in experimentally infected rabbits. The schistosomes got from the veins of cattle are illustrated. The author has found that eggs in semi-solid stools cease to be viable after 6 days at about 20°C. Cattle are then significant in the spread of Japanese schistosomiasis. C. L.

POYS (Juan A.) Studies on Schistosomiasis Mansonii in Puerto Rico. V. Clinical Aspects of Schistosomiasis Mansonii in Puerto Rico.—*Puerto Rico J. of Public Health & Trop. Med.* 1937 Dec. Vol. 13 No. 2. pp. 171-254. With 10 graphs & 8 figs. on 4 plates. [32 refs.] [Spanish version pp. 235-349.]

A clinical study of Mansonian schistosomiasis in Porto Rico dealing with the subject on the lines of the author's belief that there are two types of this infection hepatosplenic and intestinal and that apart from an initial stage common to both there is in every case an early selection of that part which will suffer most. After prodromal symptoms in general vaguely intestinal which marked a latent period of 39 to 45 days in those in whom the date of infection could be fixed to a day there begins abruptly the initial febrile stage often with a rigor and often accompanied by abdominal discomfort pain or colic or dysenteriform symptoms. Cough was consistently present in cases seen early. Tenderness was invariable over liver spleen or intestine and often marked over the caecum. In the blood eosinophilia was marked even up to 59.5 per cent of leucocytes. The first days on which eggs were noted, after fever began and after the date of infection were as follows—it apparently not however being the case that there was a daily stool examination—3 to 9 and 48 in seven patients and for the rest for one patient in each category 4 and 42

9 and 42, 13 and 46 15 and 48 30 and 49 29 and unknown 49 and 98. The factors which determine where the brunt of damage shall fall in the second stage are unknown. It is an active stage of constant attack and defence for weeks, months or years. On the offensive side there are the irritation and destruction of tissue and the toxæmia on the defensive the immunological cellular reactions most important of which from the standpoint of pathological physiology is increasing fibrosis. There are dysenteric episodes but it is only by abdominal examination that there is found enlargement of both liver and spleen. As to the symptoms at this stage of the intestinal type—

The histories given by various patients are so different from each other that the tabulation of complaints and symptoms is totally impossible. They are almost invariably however referred to the gastro-intestinal tract and in the vast majority of cases center about a colitis with dysentery of lesser or greater intensity."

The third stage is one of cirrhosis with, in the hepato-splenic type enlarged spleen and a liver of varying size which on physical and blood examinations cannot be distinguished from Banti's syndrome and with intestinal obstruction in the intestinal type. In addition a number of "miscellaneous cases" are described. The paper is filled with detail, for which it must itself be consulted. C L

PERDOMO HURTADO (B.) Un caso de hepatitis febril de origen biliar clónica [Hepatitis due to *Schistosoma mansoni*].—*Gac Med de Caracas* 1937 Oct 15 Vol 44 No 19 pp 290-291

[That the hepatitis present in this case was actually due to *S. mansoni* is not to the reviewer at least altogether convincing.] The subject was a boy of 14 years, with fever up to 39.5°C diarrhoea colic, tenesmus and passage of mucus and blood. The liver was enlarged from the fourth intercostal space to four fingers breadths below the costal margin. Blood examination gave 3,370,000 red cells and 10,840 white per cmm with 58 per cent neutrophils and 17 per cent eosinophils. The faeces contained cysts of *E. histolytica* and ova of *S. mansoni*. With such a history the diagnosis of amoebic dysentery and hepatitis was natural and emetine and yatrien were given, but as no improvement occurred in four days and the schistosome ova were still abundant foudrin was administered and in two days the fever dropped diarrhoea ceased and the liver enlargement was reduced. the patient's appetite returned, his pallor receded and his strength improved. H H S

STEIN (H. B.) Infection of the Gall-Bladder by *Schistosoma haematobium*.—*South African Med J* 1938 Apr 23 Vol 12 No 8 pp 297-298 With 2 figs

In a Bantu who met his death by violence the gall bladder and biliary system were removed for histological examination which disclosed, fortuitously, it seems, schistosome ova (in microscopic sections) which were believed to have terminal spines. They were present both in the gall bladder wall and in the adjacent liver. No other organs had been removed for examination. C L.

STROCKA (Hurt) Beitrag zur Pathologie der Harnblasenbalanose [On the Pathology of Urinary Schistosomiasis].—*Arch f Schiffs- u Trop Hyg* 1938 Feb Vol 42 No 2 pp 67-74 With 6 figs. [39 refs.]

Cawston (F Gordon)  
Dec 15 Vol. 40

Bilharzia Disease.—/I Trop Med & Hyg 1937  
No 24 pp 318-322. With 4 figs

DIAMANTIS (A.) Considérations sur la chimiothérapie antibilharzienne en Egypte a propos du Fouadin Tolerance Test du Prof Khalil Bey. (Chemotherapy of Bilharziasis in Egypt with reference to Khalil & Fouadin Tolerance Test.)—/I Egyptian Med Assoc 1933 Feb Vol. 21 No 2 pp 45-56

A death from fouadin with findings and conclusions. A child of 9 infected with *S. haematobium* died collapsed after his eighth intramuscular injection of fouadin having by then received 13.25 cc or about 0.15 gm of antimony. His liver contained as much antimony as had been given in the last three injections and his death may safely be attributed to accumulation of antimony in the liver. In fact fouadin has proved as deadly as tartar emetic and as KHALIL estimates (his *Bulletin* 1936 Vol. 33 p 957) antimony given for schistosomiasis kills about 2000 persons in Egypt yearly. In the paper quoted Khalil advocated a practical method for detecting the schistosomiasis cases with idiosyncrasy to antimony to avoid fatalities and complications. With its practicability Diamantis disagrees. The method is a colour test to measure the amount of the pyrocatechin (with which antimony is combined in fouadin) which is excreted by the kidneys and there seems to be a difference of opinion as to whether the proportion of pyrocatechin normally excreted by kidneys and bowel is constant in Egypt. In the majority of cases of schistosomiasis treated with antimony in Egypt are not treated with fouadin but with a tartrate which contains no pyrocatechin so that this tolerance test is as things are capable of little use there. Moreover should all cases in future be treated with fouadin this would mean a million persons yearly with some ten injections each and to carry out the tolerance test would be an impossible task. But that 2000 persons should be killed yearly by killed them in that time and that had they kept certain rules they might have looked for natural cure. Eradication of schistosomiasis will never be got by treatment alone yet treatment when given must be safe. The point is made that death has never been brought about by 4 antimony injections according to only 4 should be given, the adult dosage being —3 cc on days 1 and 3 5 cc on days 5 and 8. Thereafter the treatment is by emetine day 11 0.06 gm. day 12 0.09 gm. days 15 18 and 22 0.12 gm. The total advocated dose of antimony is then about 0.18 gm. and of emetine 0.63 gm. with if needed one more dose 0.12 gm. of the latter on day 27. Both drugs are thus it is held kept below dangerous amounts. C L

Cawston (F Gordon) Unsuccessful Attempts at curing Schistosomiasis by Oral Tablets.—/I Trop Med & Hyg 1938 Apr 1  
Vol 41 No 7 pp 118-119

Two cases were treated with cuprochin. The first a lad of 18 weighing about 122 lb received 78 tablets or 1.8 gm. in 10 days a week later a clear urine contained many living ova he was then



given an antimony salt intravenously. The second a native woman, had by the 18th day taken 240 tablets or about 4.5 gm. and was still passing living ova.  
C. L.

- Cawston (F. Gordon). The Possibility of treating Schistosomiasis with Unguentum.—*Jl Trop Med & Hyg* 1938. Jan. 1 Vol. 41 No. 1 pp 8-10  
 — The Cause and Treatment of Bilharzia Disease.—*South African Med Jl* 1938 Jan 22 Vol. 12. No. 2 pp 51-52.

Wittenberg (G.) & Love (J.) Investigation on the Purification of Water with Respect to Schistosome Cercariae.—*Trans Roy Soc. Trop Med & Hyg* 1938 Mar 17 Vol. 31 No. 5 pp 549-570 [13 refs]

Chlorine is the only agent which can be depended upon in practice to kill schistosome cercariae and chloramine is its most effective form.

Inquiries made in Alexandria, Cairo and Tanta by these visitors from Palestine brought out the Egyptian experience covering many years, that those who lived in those cities do not get schistosomiasis provided they use only tap water for washing and drinking. Such water has undergone three processes since it left the Nile—precipitation by alum solution of a strength of 80 per million filtration through standardized quartz sand and chlorination either by a chlorine solution of 0.85 per million or by chloramine in a strength of 0.4 per million. The authors laboratory tests of the values of these processes are as follows. Alum alone or following lime does not affect these cercariae and the standard sand filtration does not keep them back. They also found that a pressure of 200 atmospheres for 6 hours did not injure them. an alkaline reaction of 11.5 pH is indeed fatal but cannot be attained in the water treatment plant. Chlorine it then is, which has protected the water users in these cities. As to its needed concentration it rapidly disappears from the water for the first ten minutes after being added to it probably being absorbed by organic matter living or dead thereafter its amount falls slowly but in the experiments death has been postponed for as much as 1½ hours. Assuming that water will not come into use for 30 minutes after chlorination the concentration of the element in the water should be as follows according to the method by which it reaches the water for gaseous chlorine the amount after 10 minutes should be 0.6 per million for sodium hypochlorite 0.42 per million for chloramine 0.22 per million. Instructions given for the preparation of chloramine solution are as follows —

Chlorine water containing about 2 grammes of chlorine per litre was prepared by introducing gaseous chlorine into the water. Two grammes of ammonium chloride (NH<sub>4</sub>Cl) were dissolved in 100 cc of this chlorine water and this solution was left to stand for about 2 hours at room temperature. 2½ cc of this solution dissolved in one litre of water formed the stock chloramine solution used in our experiments and it contained from one to two per million of active chlorine.

[In the text sodium hypochlorite is the term uniformly used in two of the tables the substance is referred to as natr hyperchlorid.]

C. L.

- HUECK (O) & WEN HUAN HUI Zur Foudainbehandlung bei *Opisthorchis sinensis* [Treatment by Foudain of Infection with *C. sinensis*]  
—Arch f Schiffs u Trop Hyg 1938. Jan Vol 42. No 1  
pp 25-27
- Of 24 cases of this infection treated with 5 or more injections of foudain 10 became negative for ova 13 remained positive and 1 died during the course

- ALICATA (Joseph E.) & SCHRATTENBURG (O Lee) A Case of Intestinal Heterophydlasis of Man in Hawaii.—*Jl Amer Med Assoc* 1938  
Apr 2. Vol 110 No 14 pp 1100-1101 With 1 fig
- The first case of heterophyid infection reported from Hawaii. A Japanese lost weight with diarrhoea. There were small fluke eggs in the faeces. The giving of 6 gm. oleoresin of aspidium brought away several hundred flukes identified as *Stellarichasmus falcaus* [which has been found in cats and in man in Formosa and Okoyama the ova resemble those of *Clonorchis sinensis*] The fresh water mullet *Ugui cephalus* was suspected as an intermediate host and in it were found metacercariae resembling the fluke as many as 263 to the gram of muscle. When these were fed to cats heterophyid flukes developed which are undescribed and the illustration given of one is not clear

- AFRICA (Candido M) DE LEON (Walfrido) & GARCIA (Eusebio Y)  
Heterophydlasis V Ova in the Spinal Cord of Man.—*Philippine Jl Sci* 1937 Mar Vol 62 No 3 pp 393-399 With 2 plates  
(1 coloured)
- A male Filipino aged 44 was found dead in a Manila street. No clinical data could be got

B.Q., male Filipino 44 years old, single bricklayer born in Bataviaos Norte but residing in Manila, was found dead in one of the streets of this city May 18 1936 and autopsied in the city morgue on the same day. No clinical data could be obtained from a brother who identified the cadaver. The following were the post mortem findings: Hypertrophy and dilatation of the heart. Sclerosis of coronary vessels. Twenty three congestion of lungs. Congestion of liver spleen, and kidneys. Meningeal haemorrhage basal extensive. Parasitological findings. Sections of the adult specimens of *H. brevicerca* and 11 *M. taeniorhynchus* were recovered from the scrapings of the small intestine. Sections of the myocardium taken from the apical region and upper segments of the dorsal and lumbar spinal cord in the lower and upper segments of the dorsal and lumbar cord respectively revealed lesions with eggs typical of cardiac heterophydlasis. Sections of the reactive tissue and haemorrhagic areas punctuated with eggs at various levels of the damaged cord. Extensive search for similar lesions in the brain was unsuccessful.

- AFRICA (Candido M) DE LEON (Walfrido) & GARCIA (Eusebio Y)  
Heterophydlasis VI Two More Cases of Heart Failure associated with the Presence of Eggs in Sclerosed Valves.—*Jl Philippine Islands Med Assoc* 1937 Oct. Vol 17 No 10 pp 605-609  
With 2 figs on 1 plate
- Of the two cases mentioned in the title heterophyid eggs were found in the heart muscle in one only though the myocardial (reticulo-endothelial) lesions in the second were those which the writers

associate with the presence of these eggs there. The adults were found in the scrapings of the intestinal mucosa of both and so were eggs in calcified areas of the mitral valves. C. L.

WANG (Shao-Hsun) & HSIEH (C. K.) Roentgenologic Study of Paragonimiasis of Lungs.—*Chinese Med J* 1937 Dec Vol. 52 No. 6 pp. 829-842. With 10 figs.

From the study of six human cases and one experimental animal of paragonimiasis of the lung, together with a review of Yamata's report, we are convinced that roentgenologic examination may demonstrate characteristic findings. The lesions are presented on the roentgenogram of the chest as single or multiple, fairly well circumscribed, usually isolated patches of infiltration situated in various parts of the lung field. These shadows of infiltration, we believe are the direct evidence of paragonimus infestation and therefore of definite diagnostic value."

"The roentgenologic examination can only offer presumptive evidence of the disease. In an endemic area the roentgenologic examination may give confirmatory findings, while in regions where the intermediate host is not present roentgenologic study may lead to the discovery of migrated cases of paragonimiasis. When isolated patches of infiltration are present in the roentgenograms, especially in cases of which the history is atypical of pulmonary tuberculosis and the sputum is negative for tubercle bacilli, the possibility of paragonimiasis should always be considered, even though the sputum may not show any ova of the parasite, as in cases where the parasites may have died, but still have left damages in the lungs."

C. L.

KELLER. Sur une nouvelle méthode de traitement de la sparganose oculaire. [A New Way to treat Ocular [Orbital] Sparganum Infection].—*Ann de l'École Supérieure de Méd et de Pharm Indochine* 1935-1937 Vol. 1 pp. 77-89. With 4 figs on 2 plates.

The number of cases of orbital sparganosis which Keller [this *Bulletin* 1938 Vol. 35 p. 223] has now treated with novarsenobenzol given intravenously with satisfying results is 12. They are here described in detail. The dosage should be kept to its adequate minimum, namely 30 mgm. to 45 mgm. for an adult, an amount which may be repeated in 4 or 5 days. C. L.

DAMMIN (Gustave J.) The Rapid Preparation of Tapeworm Proglottids for Diagnostic and Teaching Purposes.—*Jl Lab & Clin. Med* 1937 Nov Vol. 23 No. 2 pp. 192-194.

The preparation noted in the title is put through thus with the object of making clear the outlines of the uterus.

About 5 cm. of strobile containing gravid proglottids is held between 2 slides by elastic bands, immersed for 10 to 12 hours in saturated watery picric acid solution 70 glacial acetic acid 20 formalin 10. Apparently the slides are then separated and the proglottids washed in running tap water for 2 to 3 minutes, flooded when in a horizontal position with 10 per cent caustic soda solution, and closely watched so that when the peripheral part fades the ova are still a deep orange colour and so mark out the shape of the uterus. Rinsing, flooding with 5 per cent hydrochloric acid replacing in tap water for 15 minutes, bringing up slowly through stronger alcohols to a solution of

95 per cent clearing in xylene and mounting in gum dammar complete the process. An explanation of the staining reaction in chemical terms is suggested. C L

SAMU (M A) *Hydatid Disease in the Punjab*—*Indian Med Gaz*  
1938 Feb Vol 73 No 2. pp 90-94

The object of this note is to draw attention to the relatively high incidence of hydatid disease in the south western portion of the Punjab a fact that has not been previously recognized.

In 26 cases there was operative opening or excision of a cyst in one an autopsy. Diagnosis in all cases was by appearance of the naked eye. In 11 the presence of daughter cysts is reported one of them being under the pectoralis minor and bursting into the axilla in one under the latissimus dorsi the evidence for hydatid was the finding of degenerating cyst wall two patients are described as having exogenous cysts one patient had besides a cyst in the right lobe of the liver another mass between rectus sheath and peritoneum described as an exogenous cyst lying under the trapezius muscle a cyst on the lower surface of the liver was competely excised one in the right hypochondrium was drained there being no helminthic details from another man 15 of a number of omental and mesenteric cysts were removed others studding liver and spleen one sprang from the site of the pancreas and contained clear fluid a partially calcified cyst which contained a white solid mass was attached to the anterior abdominal wall a calcified cyst was found at autopsy in a spleen which had been more or less shot away a cyst undescribed was attached to the upper and posterior surface of the bladder one in the right breast was found to be a hydatid two in the neck are undetailed the same holds for two on the forehead while one over the left parietal bone is described as a typical single hydatid cyst. Race seemed to have had no effect on incidence. Locally there is about 1 dog to 10 human beings and of 156 dogs examined there was *Echinococcus granulosus* in 45 numbering from a few to many thousands. Infection rate among herbivores was 1 per cent in sheep and goats and 150 of 168 cattle the village dog is a fine scavenger of offal. C L

DUNGAL (Niels) *Echinokokkus des Herzens* [Hydatid of the Heart.]  
—*Acta Path et Microb Scandinavica* 1938 Vol. 15 No 1  
pp 90-100 With 3 figs. [12 refs.]

In a 39 year old female dying of carcinoma of the stomach, a hydatid cyst was found at autopsy in the left ventricle of the heart with perforation into the pericardium which contained 400 cc of hydatid fluid and ruptured secondary cysts. About 16 months before death the patient had a sudden attack of fever followed by great dyspnoea, these symptoms probably indicating the date of rupture. At autopsy an open foramen ovale was found, and it is suggested that the hexacanth embryo may by this route reach the coronary arteries in cases of hydatid infestation of the heart. The pathogenesis and consequences of hydatid cysts of the heart are discussed.

## MEDICAL AND SANITARY REPORTS

## PALESTINE (1936)

Palestine on the western edge of the continent of Asia at the eastern extremity of the Mediterranean Sea, is bounded by the Mediterranean on the west, Syria on the north, Trans-Jordan on the east and the Egyptian Frontier District of Sinai on the south. It has a total area of about 10 100 sq miles (somewhat larger than that of Wales). The chief town and seat of government is Jerusalem other important towns are Gaza, Tel-Aviv, Acre, Jaffa and Haifa, the last two being also the chief ports. Palestine is administered under a Mandate from the League of Nations.

*Vital Statistics*—Including the Bedu tribes as enumerated at the 1931 census, the mid year population for 1936 was estimated to total 1,339 012 persons distributed as to 848,354 Moslems 370 475 Jews 106,864 Christians and 11,219 others. For the settled population only (excluding the Bedu tribes) the relevant facts may be classified as follows —

Community	Mid-Year Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I M R. per 1 000 births
Moslems	781 789	41,543	53.1	15 624	20.0	5,657	136.2
Jews	370 471	11 009	29.7	3,371	8.8	758	68.9
Christians	106 473	3,869	36.3	1,345	12.6	440	113.7
Others	11,219	672	51.0	225	20.1	74	129.4
Totals	1,269,952	56,993	44.9	20 463	16.1	6,929	121.6

Of the total deaths recorded 8,518 were certified as to cause of death by Medical Practitioners, and of these 22 per cent were due to respiratory affections 26 per cent. to diarrhoea and enteritis and 9 per cent to infections and parasitic diseases.

*Maternity and Child Welfare Work*—To the Princess Mary Maternity Wards at the Government Hospital Jerusalem 625 maternity cases were admitted 602 live babies were born and 5 maternal deaths were recorded. To the Haifa and Nablus Government Hospitals maternity cases admitted during the year were 184 and 56 respectively.

The appointment of two British Lady Medical Officers permitted the extension of gynaecological and ante-natal services, especially amongst Moslem women. Such clinics are established at Jerusalem, Jaffa, Haifa, Acre and Nablus, and at these centres despite disturbed conditions the large attendances testify to the value of the services available.

The Medical Department conducts 32 *Infant Welfare Centres* in towns and villages—four new village centres being opened during the year under review. Voluntary Committees co-operate in association with five of the centres, and in four others Municipalities participate in the cost of maintenance. Government contributes to the support of the maintenance of the infant welfare services conducted by the Jewish Medical Organization. Summarizing the records of work

relating to the various authorities conducting infant welfare services the following facts are of interest —

Supporting Organization	No. of Centres	Children Registered	Attendances Children	House Visits by Nurses
Government and Municipal Hadassah Medical Organisation	34	9,344	251 134	84 198
Jewish Federation of Labour	15	2,692	56 711	19 414
Women's International Zionist Local Committees	19	2,149	34 494	2,724
	5	484	17 729	2,138
	4	1 082	27 620	7,867
Totals	77	15 751	387 688	116,341

The only *Midwifery Training School* is established at the Government Hospital Jerusalem (Princess Mary Maternity Wards). During the year 16 Midwives completed the course of training. Plans to establish training schools at the Nablus and Jaffa Hospitals had to be postponed for financial reasons. The supervision of practising midwives and the development of district maternity and infant welfare services is carried out by the Superintendents of Midwifery stationed at Jerusalem, Jaffa, Haifa, Nablus, Gaza and Hebron.

*School Hygiene* — The appointment of additional medical officers and nurses not being approved the work was carried on as satisfactorily as possible with existing staff. The Government School Medical Service is responsible for 378 boys' schools, 56 girls' schools and 25 mixed schools having a student population of 46 688 distributed as to 35,532 boys and 11 156 girls. The routine examinations of new entrants continued to be carried out as previously described (see this *Bulletin* 1936 Supp. p. 103\* and 1937 Supp. p. 112\*). During the year 9,826 pupils attending town schools and 10,395 pupils attending village schools were medically examined when it was found that 41.6 per cent of those in town schools and 55.6 per cent in village schools were suffering from *trachoma* while attendances for routine treatment of the disease by teachers and school nurses totalled no less than 1,856 250. The usual examination of school-children for presence of splenic enlargement was carried out 24 012 children attending town schools and 42 029 children in village schools being dealt with. Splenic rates in the former averaged 1.7 per cent and in the latter 6.7 per cent. It is noted there are also 347 Jewish Schools having 50 621 children on the registers dealt with by the Jewish Medical Service and 360 schools not provided for by Government or Jewish Medical Services and having 178 pupils on their books. During the year 23 lectures on hygiene were given by the Medical Officers to Teachers who recorded 206 attendances on such occasions. In the case of Girls' Schools the older girls receive training in mothercraft and infant welfare under the direction of the Superintendents of Midwifery and Infant Welfare Nurses.

*Public Health Sanitation etc* — In spite of serious disturbances and general unrest which combined to hamper the work of the Medical Department especially in rural areas where staffs were exposed to constant dangers services were well maintained and the general health of the population at large was remarkably satisfactory. It is reported that the standard of *household sanitation and drainage* in the main

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Government and Municipal	34	9,344	251 134	84 198
Hadassah Medical Organisation	15	2,692	56 711	19 414
Jewish Federation of Labour	19	2,149	34 494	2,724
Women's International Zionist	5	484	17 729	2,133
Local Committees	4	1 082	27 620	7,867
<b>Totals</b>	<b>77</b>	<b>15 751</b>	<b>387 688</b>	<b>116,341</b>

The only *Midwife Training School* is established at the Government Hospital Jerusalem (Princess Mary Maternity Wards). During the year 18 Midwives completed the course of training. Plans to establish training schools at the Nablus and Jaffa Hospitals had to be postponed for financial reasons. The supervision of practising midwives and the development of district maternity and infant welfare services is carried out by the Superintendents of Midwifery stationed at Jerusalem, Jaffa, Haifa, Nablus, Gaza, and Hebron.

*School Hygiene*—The appointment of additional medical officers and nurses not being approved the work was carried on as satisfactorily as possible with existing staff. The Government School Medical Service is responsible for 378 boys' schools, 56 girls' schools and 25 mixed schools having a student population of 46 688 distributed as to 35,532 boys and 11 156 girls. The routine examinations of new entrants continued to be carried out as previously described (see this *Bulletin* 1936 Supp. p. 103\* and 1937 Supp. p. 112\*). During the year 9 826 pupils attending town schools and 10,395 pupils attending village schools were medically examined when it was found that 41.6 per cent. of those in town schools and 55.6 per cent in village schools were suffering from *trachoma* while attendances for routine treatment of the disease by teachers and school nurses totalled no less than 1,856,250. The usual examination of school-children for presence of splenic enlargement was carried out 24 012 children attending town schools and 42 029 children in village schools being dealt with. Splenic rates in the former averaged 1.7 per cent and in the latter 6.7 per cent. It is noted there are also 347 Jewish Schools having 50 621 children on the registers dealt with by the Jewish Medical Service and 360 schools not provided for by Government or Jewish Medical Services and having 30 478 pupils on their books. During the year 23 lectures on hygiene etc. were given by the Medical Officers to Teachers who recorded 206 attendances on such occasions. In the case of Girls Schools the older girls receive training in mothercraft and infant welfare under the direction of the Superintendents of Midwifery and Infant Welfare Nurses.

*Public Health Sanitation etc*—In spite of serious disturbances and general unrest which combined to hamper the work of the Medical Department especially in rural areas where staffs were exposed to constant dangers services were well maintained, and the general health of the population at large was remarkably satisfactory. It is reported that the standard of *household sanitation and drainage* in the main



towns was well maintained latrine and bath installations in both Arab and Jewish quarters being of the most modern type. The completion of the intercepting sewer in the reconstructed port area of Jaffa is mentioned (see this *Bulletin* 1937 Supp. p 113\*) but it is said that though in Jerusalem a decision to extend sewer connections was reached, no great progress in the actual work can be recorded. The Consulting Engineers have in hand schemes applicable to Haifa, Jaffa and Tel Aviv. Despite all difficulties the work of installing latrines in villages—mainly in areas where the incidence of hookworm is high—was carried on practically without interruption. In 45 villages 4 708 latrines were installed. The Municipal Sanitary Services already overtaxed (see this *Bulletin* 1937 Supp. p 113\*) were operated under exceptional difficulties owing to the civil disturbances. In the smaller towns scavenging was reasonably satisfactory though methods of disposal are primitive but in the villages this work makes but slow progress.

The new water supply for Jerusalem from Ras-el Ain was brought into use (see this *Bulletin* 1937 Supp. p 112\*) but as the softening and filtration plant was not completed purification was effected by chloramine added to the supply at the last pumping station before the reservoirs, and the purity of the supply maintained at a high level throughout the year. Little advance is reported as regards other municipal supplies. The Consulting Engineers have reached no definite proposals with regard to additional supplies to Jaffa and Tel-Aviv. Investigations continue in the matter of the Haifa supply. Though the programme for the improvement of existing village water supplies was considerably hampered, a number of schemes have been completed and have provided comparatively adequate and pure supplies in areas where previously water was drawn under insanitary conditions.

Only a comparatively small programme of major schemes of anti-malarial work was possible during 1936 no new works were undertaken and activities were restricted to the improvement and completion of existing works which included those of Birket Ramadan, Rubin March, Tel-el Rah and Tiberias Lake Shore.

A scheme for the housing of labourers who live in shacks under appalling conditions in and around Haifa has been prepared, and one similar for Jaffa. Work involved under the Public Health (*Rules as to Food*) Ordinance was to some extent disorganized by the prolonged strike when all Arab establishments were closed. Special attention was devoted to the inspection of milk and butter and of fish brought by the desert route from Baghdad. The inspection and licensing of premises was continued.

The Staff of the *Railway Medical Service* remained unchanged and continued to carry out routine work as in previous years. The housing programme (see this *Bulletin* 1937 Supp. p 114\*) was almost completely stopped on account of political disturbances and little progress can be reported. Total attendances of railway personnel at the clinics of Medical Officers were 18 140 and of these 13,261 were new cases.

*Port Health Work*—Quarantine restrictions were imposed at various times against cholera for arrivals from India, Stain and Ceylon plague for arrivals from Malta and India, and smallpox against arrivals from India. During the year 1,957 steamers and 551 sailing vessels entered the port of Haifa, 48,204 persons disembarked and were notified for surveillance 22,008 of these being immigrants who

were medically examined etc before being allowed to enter the country. The port of Jaffa was closed during practically the whole period of the Arab strike with the result that only 603 steamers and 273 sailing vessels entered. 8645 persons disembarked and of these 4,523 were immigrants who were dealt with as at Haifa. Rat catching at the ports was continued but on examination none showed any signs of plague.

Of the total of 57 717 persons entering the country during the year and subjected to medical surveillance 95 per cent were traced to their destinations. 784 Palestinians and Transjordanians made the pilgrimage to Mecca returning pilgrims being subjected to medical surveillance in accordance with usual practice.

*Air traffic* becomes increasingly important. 462 aeroplanes landed at Gaza 381 at Ramleh and 59 at Haifa. Concentration of traffic at Lydda airport will greatly simplify quarantine work of these services.

*Hospitals Dispensaries etc*—New construction of buildings was entirely suspended, there was no advance in the work on the proposed new Mental Hospital (see this *Bulletin* 1937 Supp p 115\*) the provision of a Tuberculosis Sanatorium Hospital (see this *Bulletin* 1937 Supp p 117\*) the expansion of Nablus and Safad Hospitals and construction of the Ramleh Hospital the new Infectious Diseases Hospital at Jerusalem (see this *Bulletin* 1937 Supp p 114\*) or the Maternity Block at Jaffa. There was therefore no expansion of hospital bed accommodation to meet increasing needs the British section was especially overcrowded and the amount of surgical work both among in and out-patients at Government Hospitals increased considerably owing to the admission of the large number of severe cases among Army and R.A.F. personnel wounded during the political disturbances.

The record of work at all institutions during 1936 reads as follows —

Description	Beds	Admissions					Deaths
		Moslems	Jews	Christians	Others	Total	
9 Government and Municipal Hospitals	844	7,724	8,552	2,409	129	18,814	1,263
4 Prison Wards	72	1,003	142	70	13	1,228	1
29 Voluntary Hospitals	1,895	7,894	15,468	4,338	1,729	29,479	1,214

The accommodation at various hospitals is acutely inadequate and expansion is urgently necessary. The greatly augmented number of British troops and continued presence of ships of the Royal Navy for whom adequate military hospital accommodation was not arranged before August threw a considerable amount of extra work upon already over taxed staffs and hospital accommodation.

Exclusive of ophthalmic and other special clinics there are 20 Government and Municipal *dispensaries and out-patient clinics* where during the year under review 139,968 new cases were treated, *eye diseases* accounting for 7,556 and *malaria* for 1,158 of the total patients among whom 72 per cent were Moslems and 17 per cent Jews.

At the 41 *voluntary dispensaries and clinics* 625,248 new cases were dealt with over 80 per cent. of the patients were Jews and only 14 per cent. Moslems here again *eye diseases* with 106,762 cases were

towns was well maintained latrine and bath installations in both Arab and Jewish quarters being of the most modern type. The completion of the intercepting *sewer* in the reconstructed port area of Jaffa is mentioned (see this *Bulletin* 1937 Supp. p 113\*) but it is said that though in Jerusalem a decision to extend sewer connexions was reached, no great progress in the actual work can be recorded. The Consulting Engineers have in hand schemes applicable to Haifa, Jaffa and Tel-Aviv. Despite all difficulties the work of installing latrines in villages—mainly in areas where the incidence of hookworm is high—was carried on practically without interruption. In 45 villages 4,708 latrines were installed. The Municipal Sanitary Services already overtaxed (see this *Bulletin* 1937 Supp p 113\*) were operated under exceptional difficulties owing to the civil disturbances. In the smaller towns scavenging was reasonably satisfactory though methods of disposal are primitive but in the villages this work makes but slow progress.

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responsible for much disability while *malaria* was treated in 2,923 patients

*Voluntary village clinics* dealt with 287,911 new cases, the majority being Jewish patients in 257,348 eye diseases accounted for 11,626 and *malaria* for 1,727 of the total cases

*The training of nurses* was continued 53 first year 44 second year and 32 third year nurses succeeded in passing the respective grade examinations

The two *Government Mental Hospitals* at Bethlehem were constantly full few new cases could be admitted, and there is a waiting list of some 179 cases Admissions numbered 33 deaths 3 and at the end of the year there were 157 patients in these institutions. *The Ezrahi Vashin Hospital for Jewish paying cases* admitted 24 patients two died and there were 58 in-patients at the end of the year

*The special ophthalmic service* the ophthalmic sections of the general clinics at Government hospitals and dispensaries, and the Mobile Ophthalmic Unit continued to be actively employed throughout the year The epidemic of acute conjunctivitis was of a milder type and attended with fewer complications (see this *Bulletin* 1936 Supp. p. 106\* and 1937 Supp. p. 115) New cases were very slightly fewer than in the preceding year viz. 63,490 as compared with 64,745 an increase in the total of attendances for treatment was recorded As regards eye conditions dealt with these included 43,954 cases of *trachoma* 5,348 of *trachoma* with corneal ulceration and 27,669 of *acute conjunctivitis*

Reported cases of infectious diseases numbered 10,960 with 1,168 deaths *measles* accounted for 3,489 cases and 199 deaths and *typhoid and paratyphoid fever* for 1,318 cases with 146 deaths The Report under review discusses at varying lengths the principal items of morbidity experience during 1936 summarized notes of some of the commentaries follow hereafter

The incidence of *malaria* is said to have been low in rural, and negligible in urban areas Actually, there was a slight increase in the number of cases of the disease treated at public dispensaries but taking into consideration the total number of patients treated for all causes of ill health the percentage of *malaria* patients was lower among 785,216 dispensary patients dealt with 4,081 were treated for *malaria* There is no reference to the total of *malaria* patients treated in the various hospitals but 840 cases were notified and these involved 4 deaths one non-fatal case of *blackwater fever* was recorded Anti-malaria services in both urban and rural areas continued to be actively employed mainly on measures of a recurrent nature and on the maintenance of major works already completed (see above *Public Health* and this *Bulletin* 1937 Supp. p. 115) A favourable influence was the failure of the rains in late spring facilitating the drying-up of temporary collections of water and swampy ground before the commencement of the anopheline breeding season The disturbed political situation rendered the regular supervision of mosquito breeding places a matter of no little danger and difficulty yet a considerable amount of valuable work was successfully accomplished the anti-malaria statistics are supplied in great detail in a series of tables The examination of school-children for presence of splenic enlargement has already been briefly mentioned in the section *School Hygiene* above

At the Government Laboratory where 11,600 blood films were examined for the presence of *malaria* parasites 911 proved positive

and of these 77.2 per cent were *benign tertian*, 21.9 per cent *subtertian* and 0.9 per cent, *quartan* infections. In the Entomological Division work during the year was confined to the routine identification and classification of insects of medical importance—mainly anophelines in their larval and adult stages.

No case of *smallpox* was reported. Vaccinations in the villages were somewhat fewer during the summer owing to disturbed conditions. 77,960 vaccinations were performed during the year. The incidence of *cerebrospinal meningitis* declined by comparison with 1935 experience. 107 cases with 52 deaths were recorded. Cases of *acute poliomyelitis* continued to occur sporadically in small numbers. 21 cases and 5 deaths being ascribed to this cause. Of *relapsing fever* 23 non fatal cases occurred. The incidence of *measles* showed little change with 3,489 cases and 199 deaths; there were however fewer cases and deaths due to *diphtheria*—257 and 26 respectively, while of *scarlet fever* 197 non fatal cases were reported.

*Typhus fever* was responsible for 280 cases and 2 deaths as compared with 55 cases with 3 deaths in the preceding year, the increase being largely attributed to housing conditions and overcrowding following upon increased immigration. At the Government Laboratory research work on the endemic typhus of Palestine was carried out during the summer months; investigations confirm the view that the disease is not epidemic but murine typhus, a conclusion supported by the mildness of cases and a low case mortality rate.

The incidence of *enteric fever* was about half that of 1935, of the 1,318 cases and 146 deaths recorded, 1,148 of the cases and 143 of the deaths were ascribed to typhoid and the remainder to paratyphoid fever. No particular factor or group of factors can at present be held to have contributed to the decline—political disturbances restricted population movements in some areas, yet the decline was as marked in areas where such restrictions were scarcely felt, a shortage of green vegetables may have been a factor. Some time must elapse before any definite conclusions can be reached.

At the laboratory the agglutinin content of 21,645 samples of sera was evaluated, among the positive reactions being 890 *Bact. typhosum*, 82 *Bact. paratyphosum A*, 152 *Bact. paratyphosum B* and 10 *Bact. paratyphosum C*. From 5,120 blood samples received for blood culture *Bact. typhosum* was recovered 252 times, *Bact. paratyphosum A* 25 times and *B* 26 times. Enquiry into the prophylactic power of anti-enterica vaccines containing appreciable quantities of Vi antigen was continued; results seem to establish that no mutual relation existed between the type of vaccine used and the titre of Vi agglutinin evoked.

Bearing in mind that notification of *Dysentery* is still incomplete, it is said that during 1935 the disease was not unusually prevalent, that 585 cases were reported and 39 deaths were ascribed to this cause. At the Laboratory findings resulting from the microscopical examination of 20,321 faecal specimens included *E. histolytica* (free) 279, *E. histolytica* (cysts) 309, while resulting from 9,780 cultural examinations *Bact. dysenteriae* Flexner 1 was isolated 449 times, Shiga 100 times, Strong 86, Schmitz 63 and *Bact. dysenteriae* Sonne 28 times.

*Tuberculosis*—Little was done during 1935 to relieve the existing situation; palliative treatment only was possible except in a few cases for the State tuberculosis service envisaged was not sanctioned (see this *Bulletin* 1937 Supp. pp. 116\*–117\*). Apart from the 4,592 cases discovered during the course of the survey (mentioned in these pages

a year ago) it is stated that during the year 438 cases and 201 deaths were reported. In another section of the Report 786 cases and 185 deaths are classified and of these 397 and 141 deaths occurred in towns and the remainder in the villages—among them 351 of the town cases and 118 of the deaths were ascribed to the *pulmonary* form of the disease the corresponding figures for the villages being 327 and 35 respectively.

At the Government Clinics established for the treatment of tuberculosis 514 cases were on the registers but as the Jewish Tuberculosis League caters for the Jewish section of the population these figures are mainly representative of the Arab community—the Jewish League recorded 2,233 cases. Among 4,674 specimens of sputum examined microscopically at the Government Laboratory 542 were found to contain *Myco tuberculosis*.

Notification of *pneumonia* is still incomplete—during the year 531 cases and 396 deaths were reported.

*Helminthiasis*.—In the orange growing areas *hookworm* continued to be prevalent (see this *Bulletin* 1937 Supp p 117\*). The re-survey of the Jaffa district though hampered and disturbed by political conditions was continued, and 2,668 examinations were carried out—the percentage incidence among the untreated was 32.4 and among those previously treated only 7.8 per cent. Though village sanitation was continued satisfactorily it was found impossible to inaugurate the Department's scheme for the sanitation of the orange groves though it is hoped this work will be undertaken in 1937. An investigation into the incidence of *schistosomiasis* in the Anja River Basin (Jaffa District) was commenced, but available figures are too small to be of value at present—64 cases of the disease (*S haematobium*) were investigated in this area. The majority give a history of having bathed in the Anja River though the molluscan hosts have not yet been identified. The investigation continues. At the Laboratory where Microscopic examinations of urine totalled 45,154 ova of *S haematobium* were discovered in 49 cases and *S mansoni* in 7—the latter organism was also found 22 times in 20,321 faecal specimens other findings including *ascaris* 895 times, *trichuris* 1,587 *tacnia* 193 and *oxylostoms* 179.

Seven new cases of *leprosy* were reported and 4 deaths were ascribed to this cause during the year. Among 11,163 pharyngeal swabs examined at the Government Laboratory *Myco lepras* was found in 16 cases undergoing treatment in the Moravian Institute Jerusalem.

*Veneral Diseases*.—At the principal centres of population where the Clinics for men and women continued to function with success (see this *Bulletin* 1937 Supp p 117\*) considerable advance is reported in the treatment of these diseases. The appointment of a specialist Medical Officer enabled more systematic attention to be devoted to the problem of venereal disease and the treatment of endemic syphilis or "*Firyal*" was conducted on better organized lines for the highly infected population in Hebron and sub-district by mass examination of whole villages successively and treatment of all Wassermann-positive cases, it is hoped this endemic syphilis may be completely eradicated. The record of work shows 9,729 attendances at treatment centres as compared with 3,960 in the preceding year while during the year 560 cases of syphilis and 81 of gonorrhoea were notified. Blood samples received at the Laboratory for examination

numbered 8,240 and of these 937 proved positive by the Wassermann and 1 143 by precipitation tests while of 2,282 urethral and vaginal discharges examined microscopically 254 contained *N gonorrhoeae*

Among other diseases mentioned in the Report it is noted that three deaths were ascribed to *rabies* two of these occurring among untreated persons who had been bitten. At the 38 provincial centres supplied with the Department's anti-rabic vaccine 1,808 bitten persons were treated though in 458 cases treatment was discontinued after 10 days as the biting animal remained alive and well among the remaining 1,350 cases treated only one death occurred symptoms of the disease appearing more than 15 days after the completion of treatment Of 71 brains from suspected rabid animals examined at the laboratory 25 contained Negri bodies The Laboratory Report contains a detailed account of the anti-rabies institutes and treatment centres results of treatments measures of control etc *Tetanus* was responsible for 41 cases and 26 deaths *erysipelas* for 243 cases and 28 deaths *whooping cough* 667 cases and 11 deaths *influenza* 234 cases 3 deaths.

*Scientific*—The fully equipped Central Laboratories of the Department are situated in Jerusalem and there are also branch laboratories established at Haifa and Jaffa. The Department exercises supervisory control over other laboratories and scientific institutes maintained by private funds. Anticipated additions to personnel and special equipment were not realized owing to the civil disturbances and their adverse effects upon budgetary estimates yet the volume of work dealt with by the Bacteriological Division again showed an increase 253,017 specimens were received for examination and in addition large supplies of prophylactic and curative vaccines etc were prepared. The principal specimens received and findings recorded have already been the subject of brief reference in the preceding notes. It remains to say that though disturbed conditions combined to hamper research and epidemiological investigation much useful work was continued these enquiries included work on the endemic typhus of Palestine the degree of virulence possessed by positive cultures of *C diphtheriae* the prophylactic power of variously prepared anti-enterica vaccines etc The work of the Entomological Division during the year was referred to in the notes on malaria above. In the Chemical Division 9 188 samples were examined as compared with 11 194 in the preceding year the decrease being attributed to curtailment of sampling and diminished industrial activities consequent upon the civil unrest. Special investigations were carried out in connexion with local soils in the citrus belt the following scientific papers were published —

PUFFELS (M.) The problem of chlorosis in citrus trees — *Hassadeh* " Vol 16 No 6

— On the cause of chlorosis in a mulberry tree — *Hassadeh* Vol 16 No 10

— A preliminary survey of some soils of the Jordan Valley — *Hadar* Vol. 9 Nos 9 and 10

BAKER (G W) Electrolytic application of the hydrobromic test for copper — *Analyst* 1936 726 603

*Financial*—Estimated expenditure on Medical Department Services for the financial year April 1st 1936 to March 31st 1937 amounts to £P.242,831 a sum which represents 3.9 per cent of the total expenditure of the Palestine Government during the same



period. [It is noted that in the preceding issue of this Supplement expenditure was recorded as £3,211 062 whereas it should have read £P 211,062, the letter P (Palestinian pounds) having been replaced by an incorrect "3." ] *P Granville Edge*

### CYPRUS (1938)

Cyprus, an island in the eastern Mediterranean, lies some 40 miles south of Asia Minor 60 miles west of Syria and 240 miles north of Egypt. Its area is 3,584 square miles (about that of Norfolk and Suffolk combined). Nicosia, its capital, lies near the centre of the island.

*Vital Statistics.*—The relevant facts are set out below —

Area	Estimated Population	Birth Rate	Death Rate	Infant Mortality Rate
(a) <i>The Colony</i>	387,216	24.3	12.4	105.2
(b) <i>Districts—</i>				
Nicosia	118,409	32.9	11.9	87.0
Larnaca	47,977	32.1	11.1	90.6
Limasol	59,654	36.2	14.6	132.8
Famagusta	78,464	37.1	11.3	103.8
Paphos	44,514	35.2	16.8	122.6
Kyrenia	23,196	35.9	13.4	89.8
(c) <i>Principal Towns—</i>				
Nicosia	26,312	27.0	12.4	66.3
Larnaca	12,600	25.0	14.8	112.8
Limasol	16,408	29.1	13.6	104.8
Famagusta	11,531	25.9	8.4	107.0
Paphos	4,724	18.4	13.5	114.9
Kyrenia	2,356	49.2	14.1	84.0

*European Officials* resident numbered 114 with an average number resident of 76—no invalidings or deaths were recorded. There were 1,836 resident *Cypriot Officials* with an average number resident of 1,780. Twenty were invalided and 12 died during the year.

*Maternity and Child Welfare Work.*—According to Hospital Returns 552 labour cases were dealt with at the six hospitals and of this total 234 were recorded in the Nicosia Hospital Maternity Wards with 236 births and 2 maternal deaths. The training of midwives under the direction of Dr H. SYMEONIDES was continued. 15 pupils were successful at the local examination, and 15 commenced the course of training during the year. Government midwives and their pupils attended 294 confinements during 1938.

*The Child Welfare Clinics* continued to function with success in four of the principal towns with a steady increase in the volume of work. The new building referred to in these notes a year ago was completed and brought into use. The Child Welfare Associations held local Baby Shows in their respective towns and the Annual Baby Show and Health Exhibition organized by the Medical Department in co-operation with these Associations was successfully staged at Larnaca.

*School Hygiene*—The combined and continued efforts of Medical Officers and of the Director of Education and his staff succeeded in maintaining the improvements previously commented upon (see this *Bulletin* 1937 Supp p 122\*) Teachers are said to be taking greater interest in the sanitation of their schools and welfare of their pupils. Latrines are being provided in increasing numbers and instruction in personal and general hygiene regularly taught. The Honorary Dentist in charge of Dental Clinics reports an increase in school dental work. During the year 338 schools were visited 13,991 pupils examined and oral treatment given where necessary. In the Nicosia Hyrenia Districts 76 per cent of the 6,549 children examined had defective teeth.

*Public Health Sanitation etc*—A scheme providing for the reorganization of Medical Department services became effective on February 1st. The changes introduced are expected to produce increased efficiency and smoothness in the administration of all services. The scheme is described in detail in an Appendix to the Report under review. An important event during the year and one marking a distinct advance in rural health control was the passing of the new Public Health Village Law. This instrument provides for the strict control of village sanitation regulation of village markets, etc. *Anti-malarial* work continued to be carried out intensively. Complete surveys were carried out by the International Health Division of the Rockefeller Foundation in marshy areas responsible for intensive *A. elutus* breeding (see also this *Bulletin* 1937 Supp p 124\*). The main difficulty in malaria control in Cyprus is however in dealing with streams and shallow pools the breeding places of *A. superpictus*.

With regard to *sewage disposal* it is said that though new houses often have water-carriage systems to septic tanks installed frequent shortage of water so seriously impairs the efficiency of such installations that an improved pattern of pit-latrines appears to be the only solution. Village sanitation has made little or no progress the absence of latrines in rural areas is a causative factor in the numerous epidemics of typhoid reported in the Island. Again the only reference made to *water supplies* (see this *Bulletin* 1937 Supp p 122\*) appears to occur in the Government Laboratory Report where it is noted 72 samples of water (mostly from proposed new sources of supply) were examined and only 42 of them were found to be potable.

Though much has been done to improve *housing conditions* in the principal towns much still remains to be accomplished if the mistakes of the past are to be corrected. The difficulty attending efforts to improve conditions are commented upon and special mention is made of the problem of overcrowding in mining areas and surrounding villages and of the importance of providing better ventilation in village houses. Housing conditions in mining areas received special attention a building programme of some magnitude is to be implemented by the Cyprus Mining Corporation.

*The Sanitary Inspectors* School opened in November with 25 pupils the course covers 5 months followed by 2 months practical work. In addition arrangements exist for Sanitary Inspectors in outlying stations to attend refresher courses.

*Recommendations* made by the Director of Medical Services include the appointment of a Tuberculosis Officer of a full time Dental Officer

provision of a training school for nurses a travelling eye clinic, and an out patient clinic and dispensary on Troodos.

*Port Health Work*—During the year the Medical Staff visited 602 steamships and 531 sailing vessels arriving at Cyprus ports and in addition examined 37 aeroplanes arriving in the Island.

*Hospitals Dispensaries etc*—The work at Government Hospitals both surgical and medical, is said to have increased to such an extent that beds were always occupied so that many cases seeking admission had to be refused daily. There are Government Hospitals in Nicosia and Limassol, and State-aided Hospitals in four other towns. Work at these institutions may be tabulated as follows—

Hospital	Beds	In-patients	Deaths	Out-patients
Nicosia	103	1,833	94	29,422
Limassol	45	763	42	9,970
Larnaca	55	1,034	24	6,800
Famagusta	36	837	20	6,407
Paphos	28	657	26	4,200
Kyrenia	32	571	17	2,525

Work of construction on the new Nicosia Jubilee Hospital was started and certain sections were almost completed by the end of the year. An illustration of the new building appears as a frontispiece to the Report under review. Various improvements were carried out to the Hospitals in Famagusta and Kyrenia and a new building for the accommodation of nurses was completed at the Paphos Hospital. The *Rural Hospitals* continue to do excellent work. the Lysi Hospital approaches completion and a new hospital at Polis was to be opened during 1937.

There are *Dispensaries* attached to each of the Hospitals in the six principal towns and 10 rural dispensaries established in various parts of the Island. At these centres 88,470 new and 87,631 old cases received treatment. The new system of *Malaria Certificates* (see this *Bulletin* 1937 Supp. p. 123\*) resulted in the addition of nearly £2,000 to hospital revenues.

An excellent *Isolation Hospital* has been built by the Cyprus Mines Corporation.

The notes which follow briefly summarize more extended references and descriptions of morbidity experience contained in the Report under review.

*Malaria* not being a notifiable disease it is not possible to measure incidence in the Island with any degree of accuracy. Fewer cases were reported during 1936 namely 12,779 as compared with 17,917 in the preceding year but malaria cases are said to have constituted no less than 75 per cent of the total in and out-patients suffering from communicable diseases during 1936. Among 536 hospital in-patients, benign tertian infections numbered 412, subtertian 87 *malaria cachectica* 36 and *quartan* one. The corresponding distribution among 12,228 out-patients being 9,392, 775, 1,630 and 431. There were also 15 non-fatal out-patient cases of *Blackwater fever*.

Brief reference has already been made to the malaria control work carried out by the Department and the special surveys conducted by members of the International Health Division of the Rockefeller

Foundation (see *Public Health* above) As an Appendix to the Annual Report is presented a comprehensive account of the activities of the Rockefeller Foundation contributed by Drs. W. H. STRATMAN and THOMAS M. A. BARBER and Mr. J. C. CARTER. This special report has been reviewed at length in this *Bulletin* 1933 Vol. 35 p. 257. At the Government Laboratory where 511 blood films were examined 39 were positive with *P. falciparum* and 35 with *P. vivax* it is added that as the majority of films for the routine examination for the presence of malaria parasites are not sent to the laboratory these findings are no indication of the prevalence of the disease.

*Enteric fever* is said to be increasing with such steady persistence as to give rise to no little anxiety the numerous outbreaks being attributed to the absence of latrines in rural areas (see *Public Health* above) where without exception the system of open yard latrine is the rule. During the year 667 cases were reported a 21 per cent increase over 1935 experience and 44 deaths were ascribed to the disease. Hospital in patients numbered 182 with 25 deaths all were *Bact. typhosum* infections. Among 199 out patients types of infection were 187 *Bact. typhosum* 9 *Bact. paratyphosum* 4 1 *Bact. paratyphosum* B and 2 undefined. The Report supplies details of reported cases tabulated with distinction of sex age locality and season. Temporary hospitals were established in villages where the disease occurred in epidemic form and the usual routine precautions taken. T.A.B. inoculations were carried out on a large scale but on account of the reaction it is stated a large number of persons refused to submit to a second inoculation. At the Laboratory where 721 specimens of sera were examined for the presence of the specific agglutinins of the enterica group 292 proved positive to *Bact. typhosum* 44 to *Bact. paratyphosum* A and 25 to *Bact. paratyphosum* B.

The incidence of *dysentery* is said to have steadily declined since 1930 insaniary conditions especially in rural areas contribute to maintain the infection. During the year 51 cases were reported as compared with 133 in the preceding year. The disease appears to show a preference for the 0-5 age-group but it is believed a considerable number of the cases reported among children at these ages were not real *dysentery* but the ordinary enteritis of the summer season. There were 10 non fatal cases among hospital in patients type of infection was undefined. Among 30 out-patients 7 were suffering from the amoebic and 23 from the bacillary form of the disease. At the Laboratory where 70 faecal specimens were examined the findings included one *E. histolytica* one the cysts of *E. histolytica* and one *Bact. dysenteriae* Flexner. It is stated that few parasites of the Shiga type have been observed and bacteriologically confirmed.

In one section of the Report it is stated that *cerebrospinal meningitis* made its appearance in July the first case being reported from Famagusta District. In another place where cases are tabulated by District and month of occurrence Famagusta is not mentioned but one case was reported in Nicosia and one in Limassol in September. In any case between September and the end of the year 38 cases with 10 deaths [Hospital Returns record 43 cases] were reported from Nicosia Limassol and Paphos Districts. Routine activities were abandoned when cases were reported and all efforts were directed towards meeting the emergency. At the close of the year the epidemic was still in existence a detailed report is to be submitted.

*Diphtheria* is said to have given rise to 31 cases the majority of them occurring in the Nicosia District. 24 of the cases occurred in the 0-5 age-group and 5 in the 5-10 group. Hospital Returns record 3 cases with 1 death among in-patients and 10 out-patient cases. No case of *smallpox* or *plague* occurred. During the year 11,839 anti-smallpox vaccinations were performed and anti-rat measures carried out at the principal ports. At the Laboratory 847 rat spleen smears were examined all were negative for *Pest. pestis*.

*Tuberculosis*—The funds collected during the Silver Jubilee of the late King George V for the erection of a modern sanatorium for the care and treatment of cases of tuberculosis were augmented by a gift of £10,000 from the Colonial Development Fund. As soon as a suitable site has been selected constructional work will be commenced. Mr D. N. Dimitriou has given £3,000 for the building and equipment of a Tuberculosis Dispensary at Larnaca this building should be completed during 1937.

The Anti-Tuberculosis League is firmly established and actively engaged in the routine care of needy tuberculosis sufferers. The League magazine *Cyprus Public Health* which deals with the prevention of the disease is distributed monthly to schools, etc. During the year the National Association for the Prevention of Tuberculosis donated £100 towards the cost of establishing a tuberculosis dispensary at Nicosia, and also arranged for Dr N. D. Bardswell, a recognized authority on the disease and Nurse Jays to visit the Island, and co-operate with the Medical Department in efforts to deal with this important public health problem. The visitors, assisted by various officers of the Medical Department, are engaged on a survey throughout the Island. The inadequate accommodation for male patients at the Athalassa Sanatorium was augmented and through the generosity of Mr M. C. Georgiades a pavilion for the accommodation of 8 female patients was erected. The Honorary Physician Dr T. K. EVANGELIDES contributes a special report on the year's work at this institution.

During the year 280 cases of *pulmonary tuberculosis* were reported in the Island. It is stated that as notification is incomplete the recorded facts are no measure of actual incidence. Among 185 hospital in-patients treated for all forms of tuberculosis with 34 deaths 118 were suffering from the pulmonary form of the disease and 29 died. Among out-patients 228 out of 366 tuberculosis patients were pulmonary cases.

It is stated that as finances permit tuberculosis control work will develop along lines requiring (a) the appointment of a full-time British Tuberculosis Officer (b) of Tuberculosis Nurses and (c) the establishment of Tuberculosis Dispensaries at Nicosia, Larnaca, and Limassol.

*Trachoma* as shown by notified cases, is a major Public Health problem, and serious efforts are necessary to bring it under control. During the year 8,963 cases were notified and approximately 15,000 cases of eye disease mostly trachoma were seen. The Honorary Oculist dealt with 2,883 new cases of which 1,499 were trachoma, and the three Travelling Oculists with 8,590 new patients, of which 7,464 were suffering from trachoma. Fifteen nurses received special training in the Government Hospital, and later were posted at trachoma centres where incidence was highest to carry out routine treatments prescribed by the Travelling Oculists. It is hoped to increase their

numbers in the near future and also to provide a travelling eye clinic adequately staffed.

*Veneral Diseases*—The Medical Officer in charge of V D Clinics Dr N MICHAELIDES contributes as an Appendix to the Annual Report a comprehensive survey of the year's work at the five established clinics. Altogether 1,867 new and 1,026 old cases were dealt with amongst male patients among the new patients were 331 cases of *syphilis* and 574 of *gonorrhoea* the corresponding figures for old cases continuing treatment were 668 and 358 respectively. Among 853 new female patients 182 were suffering from *syphilis* and 308 from *gonorrhoea* there were also 1,014 female patients continuing treatment and of these 514 were syphilitics and 500 suffering from gonorrhoea. Blood samples submitted to Wassermann tests from the clinics totalled 4,389 and of these 1,316 gave positive and 100 doubtful reactions. The Laboratory Report records 4,698 Wassermans of which 1,269 reacted positively and 344 gave doubtful reactions. The campaign against V D was continued throughout the year.

*Leprosy*—To the Leper Farm Hospital which has accommodation for 12 patients 66 admissions were recorded during the year at the clinic attached to this hospital lepers are given their injections and dressings. At the Leper Farm itself 14 patients were admitted 5 died and 11 were paroled during 1936 and at the end of the year there remained 105 lepers at this institution.

Dr S LYSANDRIDES Medical Superintendent of the *Mental Hospital* again contributes in an Appendix to the Annual Report a detailed account of the year's work at that institution. He observes that during 1936 the number of patients admitted and the number under treatment were the greatest ever recorded. Patients admitted or re-admitted totalled 64 ten died, 34 were discharged and at the end of the year 205 remained. A 12 bed hospital for the treatment of patients physically ill has been erected.

*Other diseases* commented upon in the Report include the following. In patients suffering from *cancer* numbered 185 and 9 of them died there were also 252 out patients treated for this condition. In an Appendix to the Annual Report the Surgical Specialist Dr C C. CURRY deals at some length with the work of his Department and amongst other matters supplies a detailed survey of the results of radium therapy and the surgical operations carried out for malignant disease. *Rheumatism* appears to be the cause of much disability 116 in-patients and 3,162 out patients received treatment for the disease. With regard to *helminthic diseases* it is noted that no cases of *ankylostomiasis* or *schistosomiasis* were recorded. Of the latter condition it is stated the disease has almost disappeared and that the snail hosts of the infection are not readily found. Hospital cases of *ascariasis* numbered 197 of *taeniasis* 60 and of *oxyuriasis* 217. No less than 2,918 persons received hospital treatment for wounds of various kinds 1,520 having been caused by stabbing or cutting instruments.

[It is noted that in the *Returns of Diseases and Deaths* the nomenclature employed is that of the International Commission 1920. The most recent revised International List is that of 1929.]

*Scientific*—The eleven *Special Reports* figuring as Appendices to the Annual Report are (1) Report on the Re-organization of the Medical Department by the Director of Medical Services Dr E A NEFF (2) Report of the Surgical Specialist (3) Pathologist (4) Chemist (5) International Health Division Rockefeller Foundation (6) Mental

Hospital (7) Communicable Diseases (8) V D Clinics (9) Honorary Dentist (10) Athalassa Sanatorium and (11) Limassol Municipal Health Report. The majority of these have already been quoted in the preceding notes.

The Report of the Pathological Branch records a further increase in the volume of work dealt with. During the year 10,031 specimens of various kinds were received, examined and reported upon—the more important of these and findings recorded are briefly referred to under various headings in the preceding summaries. The Government Analyst received and analysed 1,671 samples of which 1,657 were from official sources and included 849 samples of foods and drugs. The Government Analyst who was on the Board of Examiners in Pharmacy for the Government Qualifying Certificate also gave a course of lectures on subjects of sanitary importance at the School for Sanitary Inspectors.

The following scientific papers were published —

WILLMOTT (S. G.) A Study of *Colocasia* (*Colocasia antiquorum* Schott) — and FREEMAN (M.) Potassium Permanganate Poisoning. [This paper was noted in this Bulletin 1937 Supp., p. 127\*.]

Financial.—Total expenditure on Medical Department services during 1936 amounted to £53,555, a sum approximating 7 per cent. of the total expenditure of the Colony for the year under review.

P. Granville Edge

### GIBRALTAR (1936)

Gibraltar consists of a long mountain block (the Rock) rising to a height of 1,906 feet, 3 miles long and  $\frac{1}{2}$  mile broad, joined by a low sandy isthmus to the southern extremity of Spain. The town is built on the western and southern sides of the Rock, facing the Bay of Algeciras; the northern and eastern faces are inaccessible cliffs.

Vital Statistics.—At the end of the year the Police estimate of the resident population was 19,194 persons: 16,875 were British subjects and 2,319 were Aliens. The revolution which broke out in Spain in July caused a considerable influx of refugees from neighbouring parts of Spain; exact numbers are unknown, but the Medical Officer of Health was of the opinion that for a short time after the 18th of July "the excess population was not far short of ten thousand. Statistical facts refer solely to the normal resident population. Registered births numbered 304 and deaths of British subjects 249 and resident Aliens 12, or a total of 261. [The crude birth and death rates are given as 19.3 and 15.47 respectively but it is difficult to know how these rates were calculated. On the basis of end-of-year total resident population (no mid-year estimate is supplied) the birth rate would be 15.8 and the death rate 13.6 per 1,000. The same sort of difficulty was experienced a year ago in regard to methods applied for the calculation of rates (see this Bulletin 1937 Supp. pp. 127\*-128\*).]

Infant deaths numbered 19 and the infant mortality rate is stated to be 62.09 per 1,000 births. [If the latter were true then it would appear to have been calculated on a basis of 306 "births" (presumably all live births) but if on the basis of 304 births the rate would be 62.5 per 1,000. In another part of the report it is stated "23 stillbirths were recorded. If these were included in the 304 births referred to then the I.M.R. would correctly be 67.6 per 1,000 live births].

*Maternity and Child Welfare Work*—During the early part of the year the plans for increasing accommodation at the Colonial Hospital were carried out (see this *Bulletin* 1937 Supp p 128\*). Had this not been done it would have been impossible to deal with the large numbers of patients for 283 women were admitted to the Maternity Wards during the year. Of the total admissions 176 belonged to the resident population and 107 were British subjects ordinarily resident in Spain and Spanish subjects temporarily living as refugees in Gibraltar. These groups were delivered of 151 and 90 babies respectively. At the Colonial Hospital one pupil commenced the course of training in midwifery. Of the work of midwives the only reference in the Report mentions that one under contract with the Public Health Department attends the confinements of poor persons (see also this *Bulletin* 1937 Supp p 128\*).

At the *Child Welfare Centre* fortnightly meetings continued to be held and the average attendance was 88. Milk and other foods were distributed at reduced prices or free in necessitous cases. The nurse paid 420 home visits and during the year 225 children were treated in the Children's Ward of the Colonial Hospital.

*School Hygiene*—During the first six months of the year visits to 28 schools were paid and 185 children referred to the Medical Officer for examination and treatment. 40 were found to be suffering from defective vision or other eye defects. 45 from skin diseases. 31 from enlarged tonsils. 49 from general debility and the remainder from other conditions. 129 of these children attended the School Clinic for treatment.

The School Dentist treated 478 children for various oral defects and continued his voluntary talks to children in the schools. The Soup Kitchen financed by voluntary subscriptions and operated by voluntary workers continued to play an important part in maintaining nutrition during the winter months. The average daily attendance was 550.

*Public Health Sanitation etc*—For descriptions of the Medical Services directly administered by the Colonial Government the sanitary work under the City Council, and the Board of Health Quarantine Services see this *Bulletin* 1933 Supp p 114\* 1935 p 115\* and 1936 p 119\*. *Sewage and Refuse disposal* methods remain for all practical purposes as described on page 100\* of the 1934 issue of this Supplement.

With regard to potable *water supplies* it is reported that a new reservoir of one million gallons storage capacity was completed and brought into use and that extensive repairs and renewals to catchment areas were carried out during the year. *Brackish water* is supplied from wells for general purposes other than potable.

In August H.E. the Governor appointed a Commission of Enquiry on the Housing Rent Restriction etc. to report upon the position in Gibraltar. The results of the enquiry will be referred to in the 1937 Medical and Sanitary Report. With a view to testing the value of some of the Commission's proposals a block of model tenements for the working classes was designed and erected. Families from properties in bad repair were removed and though rents were higher willingly accepted the exchange to the new dwellings. The experiment proved highly successful.

The routine supervision of milk and food shops inspection of foods for human consumption etc. was continued and samples taken for



## MALTESE ISLANDS (1936)

The Maltese Islands, a group of islands in the Mediterranean Sea, are distant about 58 miles from the nearest point of Sicily 80 from Syracuse 142 from Reggio and 180 from the nearest point of the mainland of Africa. Malta itself is 17 miles long, 9 broad and has an area of almost 95 sq miles. Gozo, 28 sq miles., Commo and Filfla are mere islets, the area of the former being about 1 sq mile. The whole group has about half the area of the Isle of Man.

*Vital Statistics*—The recorded facts relating to these Islands continue to be presented in great detail, viz. *Population* total at all ages for each locality and also in age groups 0-1 0-5 and 5 and over *Births* and *Deaths* totals for each locality. *Mortality* data also presented by causes of death for each month of the year by sex and in 13 age groups for each locality by causes of death for each sex in 17 age groups. Summarizing the principal facts we have —

	Malta	Gozo	Both Islands
Estimated Population	236,479	25,686	262,165
Births	8,110	768	8,878
Birth rate per 1,000	34.2	29.7	33.8
Deaths	4,167	420	4,587
Death rate per 1,000	17.7	16.4	17.6
Infant Deaths	1,545	144	1,689
Infant Mortality Rate per 1,000 Live Births	180.5	186.2	180.3

The Infant Mortality rate though still high, appears to be the lowest ever recorded for these Islands.

*Maternity and Child Welfare Work*—A general service of a preventive and advisory nature for ante-natal and post-natal care of mothers and for infant welfare has still to be set up. Meanwhile consultations for out patients are held at the Central Hospital and the District Dispensaries. District Nurses visit newly confined mothers and give advice on infant care etc. 6,915 such visits were paid in Malta and 1,118 in Gozo. The Mothers and Infants Health Association in receipt of an annual contribution, has established Health Centres in four towns. Lying-in Wards are provided in the General Hospitals in both Islands. Outside the Hospitals it is said that practically every confinement is attended by a certified midwife Government paying the fee in necessitous cases.

*School Hygiene* receives no mention in the Report under review except in the observation, "Systematic teaching of the rules of health should form an integral part of the ordinary curriculum in the schools."

*Public Health Sanitation etc*—Dr A. V. BERKARD the newly appointed Chief Government Medical Officer pays a generous tribute to the valuable public health work accomplished by his predecessor Dr A. CURTIS who retired from the service in October 1936.

As regards general sanitation, towns, suburbs, and several villages are provided with water borne *sewerage* systems. Several extensions were carried out during the year. Where no sewers exist house drains are connected with *impervious cess-pits*. Towards the end of the year the objectionable methods characterizing the unorganized collection of

refuse were abolished and an improved service inaugurated. Piped water supplies are available in almost every part of both Islands. Drought conditions during the year necessitated restricted supplies. new storage galleries when completed will provide welcome increases in main supplies. Housing accommodation increases fairly satisfactorily all new buildings alterations and additions to existing buildings etc. must first receive the approval of the Superintendent of Public Health. The routine inspection of food of shops, stores, slaughter houses etc. continued as usual. In a series of Appendices to the Report under review detailed accounts of the various public health services are presented.

*Port Health Work*—The Quarantine Medical Officer is also Medical Officer of the Infectious Diseases Hospital in Malta. the year's work is described at length in an Appendix to the Annual Report. Briefly, 1,971 steamships and 131 sailing vessels entered Malta ports and the arrivals of 6 British and 95 foreign aircraft were recorded. Inward passengers numbered 13,333 and outward passengers 12,052. Eighty-seven steamers were kept in quarantine. 65 reported having or having had infectious diseases on board. Three cases of infectious disease among passengers and crews were admitted to the Contagious Diseases Hospital and 11 to other hospitals. A Sanitary Inspector was appointed to the Port Health Staff during the year. The trapping of rats in harbour areas continued. it is stated that none was found plague-infested (but see also *Plague* below).

*Hospitals, Dispensaries, etc.*—These institutions are occasionally mentioned here and there in the text of the Report but are not dealt with in detail in any separate section. Available information seems to indicate that four institutions have accommodation for in-patients and facilities for the treatment of out-patients viz. the Central Hospital, Connaught Hospital, Gozo Hospital and the Poor House. there are also a number of District Dispensaries.

Twenty-six diseases are scheduled as compulsorily notifiable. No case of smallpox, cholera, yellow fever, typhus, dengue, indigenous malaria or hydrophobia has been recorded for many years but the remaining 19 titles on the notifiable list gave rise to 2,560 cases with 370 deaths. At the Contagious Diseases Hospital 351 cases were treated and among these 27 deaths occurred. The principal diseases referred to in the Report may be summarized as follows.

*Plague* occurred in April the Islands having been practically free from the infection for over a century. Suspicious symptoms were first reported in three members of the same family, two died and post-mortem bacteriological investigation showed infection with *P. pestis*. Energetic measures were promptly instituted to deal with the infection, for further investigation indicated an epizootic among rats. A fourth case was discovered at the end of April and thereafter cases continued to occur each month until November. during the whole period 25 cases were recorded. 19 of them gave positive bacteriological findings and 10 deaths were ascribed to the infection. At the Laboratory where 2,069 rats and mice, 28 cats, 17 rabbits and 9 guineapigs were examined, 16 rats, one cat and one guineapig were found infected with *P. pestis*. Dr. Bernard contributes a survey of plague history in Malta from the beginning of the 19th century. District Medical Officers describe cases occurring in their respective areas and the measures taken to localize the infection. The outbreak has been reviewed at some length in this *Bulletin* 1938 Vol. 35 p. 205.

The water supply of the Natives is usually obtained from shallow wells or streams, and is not protected. Their diet consists largely of cereals or cassava but milk is fairly commonly used and meat and fish where available. Cattle and goats however are not bred for slaughter so much as for currency.

*The position as regards Tuberculosis*

It is in this population that there is reason to believe that tuberculosis is now a disease of considerable and increasing importance. It has been found that even in the remote parts of the Territory half the adult population have been infected, though relatively few are diseased, and that in the populous areas the infection rate is almost equal to and the disease rate is probably relatively higher than that found in London. Natives in whom infection has proceeded to definite disease usually die fairly quickly from tuberculosis and in the one place where it was possible to estimate the death rate it was found to be roughly 2.57 per thousand population (in 1927) which was almost three times as great as that of England (1925). The numbers of cases of tuberculosis diagnosed in the Territory have risen in recent years as has happened in the other countries of East Africa, and although tuberculosis is not (as in the Gold Coast Straits Settlements and Jamaica) the principal individual cause of death it usually occupies the third or fourth place in the recorded lists. In the opinion of some Missionary doctors and sisters, who through long residence in one place have exceptional opportunities for observation tuberculosis is definitely increasing in their areas.

The majority of Native tuberculous patients suffer from the pulmonary form of the disease caused by the human type of *Mycobacterium tuberculosis*. In these patients the sputum is usually loaded with masses of the bacilli, and since neither the common Native customs nor the common Native conception of the origin of disease forbid promiscuous spitting exposure to droplet infection or the use of communal vessels the opportunities for infection of contacts exist in a marked degree. It has been found, not only in Tanganyika Territory that the family contacts of tuberculous persons are highly infected and diseased and that they show strong sensitivity to the tuberculin test.

After the family contacts (and certain other school contacts which showed similar characteristics) the highest infection rates the strongest average reactions to the tuberculin test and the greatest numbers of definite cases of tuberculous disease were found in Tanganyika Territory in the areas in which the population was most dense. As these areas differed from each other in climatic and other conditions it is probable that the similarity in the tuberculous findings depended on the closeness of the population.

These findings point to contact as the strongest factor in the spread of tuberculosis in the Natives and it follows that methods of control should be based on that supposition.

In areas of dense population the medical facilities provided for the Natives are more easily accessible and the hospitals and Health offices are usually more completely staffed and equipped than those in scattered districts. This has the advantage that the diagnosis of cases can be more easily effected there than in the more rural districts and that the examination of contacts can be made with more ease and regularity. But in these areas and especially in towns the isolation of patients under the conditions of every day life is difficult.

The Natives do not appreciate modern knowledge of the transmission of disease because it has not been taught to them over a long enough period of time and they still pass on from parent to child the old ideas of witchcraft. It is obvious that the difficulty of changing the Natives' conception of the origin of disease is great.

#### *Suggestions for control General remarks*

In Britain behind the vast scheme dealing particularly with tuberculosis is the legislation and public knowledge which has resulted in the improvement in housing, diet and general hygiene of the population as a whole. During the last hundred years the standard and conditions of living have changed greatly for the better and the public as well as the medical profession have learned to appreciate the fundamental facts of tuberculosis. The decrease in tuberculosis has depended upon the improved conditions of life, the public knowledge of the disease and the facilities provided for treatment on the widest scale. The control of infection through the isolation or successful treatment of a proportion of infective cases and through the partial eradication of bovine tuberculosis have also undoubtedly had some effect.

In East Africa the population compared with that of Britain is poverty stricken. The conditions of life are usually bad. The public knowledge of tuberculosis is negligible and the facilities provided for treatment are quite inadequate to have any effect in the control of the disease. These facilities usually consist of wards in which tuberculous patients are housed but the treatment given is with rare exceptions unlikely to arrest the disease. The principal exception to this inadequacy is the Government tuberculosis hospital and village settlement at Kibongoto, Tanganyika Territory, where Dr H. N. DAVIES has for several years successfully practised collapse therapy.

The control of infection through the isolation and treatment of infective cases therefore is an inconsiderable matter in East Africa. Fortunately tuberculosis of cattle though it does occur in some parts is not common.

In Britain the public have confidence in the treatment of tuberculosis. In Africa though the Natives are quick to acquire confidence in medical measures when they see results as in the case of the treatment of malaria they cannot have confidence in a treatment of tuberculosis which is merely expectant and is also ineffective. It is necessary to stimulate that confidence by offering active treatment so that the Natives may be induced to seek it.

It is obvious that to provide tuberculosis hospitals and dispensaries with trained staffs in East Africa on a scale comparable with that of Britain is an enormous undertaking which though desirable may never be possible. Even if it were possible it would not be effective to control the disease without the intelligent co-operation of the public. In the meantime tuberculosis is increasing and it is therefore urgently necessary that steps other than those which depend on the spending of money on the construction of special hospitals and dispensaries should be taken to commence the control of the disease. Suggestions for these are here outlined.

#### *Suggestions for a control scheme*

There exists in the colonies an organization through which Natives can be approached. The administrative, educational and medical

authorities may be in fairly close contact with them and missions maintain intimate touch.

All these departments should be informed of the problem and of the steps proposed for dealing with it. In the colonies however the existing figures of the incidence and death rates of tuberculosis unless specially collected usually underestimate the position. If more accurate knowledge is desired special investigations including tuberculin or radiological surveys, such as have already been made in certain parts, may be inaugurated with advantage.

The policy of the tuberculosis department of the County of Lancaster is succinctly outlined by Dr G. Lissant Cox— "To find, isolate, educate and treat the adult positive case." For the colonies this policy may be amplified. It should be —

- "To find isolate educate treat and provide for the cases of tuberculosis"*
- "To raise the standard of medical education in the general population"*
- "To raise the standard of living and housing"*

The finding of cases of tuberculosis does not consist of the passive method of merely diagnosing those patients who present themselves.

To be done efficiently it entails an active search especially among those who are most likely to be diseased namely the contacts and the people with chest trouble which does not within a short time improve. In one colonial town it was found that when Native sanitary inspectors were urged to report and bring to hospital Natives who suffered from chronic cough the number of cases of tuberculosis diagnosed in one year was almost double that of the preceding year. It therefore becomes the duty of the medical departments to suspect and to seek out cases of tuberculosis. If a Native sanitary inspector were to visit the home of every case diagnosed and to collect the contacts for periodical examination as a matter of routine duty a step forward would be taken. It would be necessary however to secure the willing co-operation of the Natives.

Since there is no tuberculosis service in East Africa it is usually the duty of the medical staff of general hospitals and of general practitioners, to undertake the diagnosis, the seeking out, the treatment and the supervision of tuberculous patients and their contacts. Tuberculosis in Britain has become a matter entrusted to a specially trained staff. Such a position does not obtain in any but exceptional places in the colonies, but there is unfortunately a strong disposition among colonial medical men to regard themselves as incompetent to give modern treatment to patients with pulmonary tuberculosis and therefore to take no steps other than to attempt to treat them by rest. For this reason there is little incentive to seek out fresh cases. Contact examination is only rarely undertaken and the supervision of families, with the object of the prevention of the disease in contacts is only occasionally applied.

The finding of cases of tuberculosis may be greatly assisted by non-medical bodies and individuals who are in close touch with the Natives. Missionaries are usually most willing to assist in such matters, and employers of labour schoolmasters and others have often taken the first steps towards diagnosis by urging the Natives to seek medical advice. But without some information, it cannot be expected that these people will be more than occasionally helpful. It is therefore advisable, so far as possible, to give them the little knowledge of

tuberculosis as well as of other diseases necessary to enable them to judge when to send a Native for examination. If their judgment errs on the side of over caution no great harm is done.

The isolation of cases of tuberculosis is a most difficult matter. Compulsory isolation in hospital is inadvisable and at present impossible. Even if it were possible hospitals would soon be known as places from which tuberculous patients never return and as few Natives wish to spend the remainder of their lives away from their families the tendency would be to conceal the disease in fear of the isolation.

In any case the accommodation for isolation on a large scale does not exist and would be enormously expensive to provide.

Partial isolation in the bacteriological sense however may be possible. Carefully educated sputum positive patients in England can and do by following the advice given avoid causing tuberculous disease in their children. They may infect them but infection is a usual occurrence in the white countries (and in the colonies) and need by no means proceed to actual disease.

The efficacy of such isolation in the patients' homes depends on the accommodation in the houses the intelligence of the patients and the conviction with which they accept the education given.

It is essential that isolation in this sense should be continuously attempted. It is in the family contacts of cases of tuberculosis and in the areas of dense population that the disease is most prevalent and there is little doubt that massive and continuous exposure to tubercle bacilli is the dominant factor in the spread of tuberculosis. If the disease is to be controlled and its spread prevented, it seems to be logical that since the patients must live among the general population they should be persuaded to cause as little harm as possible. As pointed out above this matter depends to a great extent on housing conditions and in this respect the raising of the general standard of living the supervision of town planning and the abolition of taxation which penalizes the construction of extra buildings are important. Village settlements here play a part but because they are expensive and as yet few in number their influence is principally that of example.

The education of tuberculous persons is of the very greatest importance. If such people are treated unsuccessfully—as is usually the case in many colonies—and are allowed to live with their families and to cause disease in them the effort is wasted. The only hopeful line of attack in tuberculous people in whom treatment is certain to fail is to prevent the spread of the disease to others. The necessary isolation in the home cannot be achieved without the understanding of the facts of infection by the patients and the families. Dogmatic and unexplained orders will be disregarded. Such understanding can be created by sympathetic and painstaking explanation. That the advice will not always be understood or acted upon is inevitable but is not a good argument against giving it. If given carefully the advice will often carry conviction and be followed, and if it is found that the instruction given is unsuccessful in carrying conviction or obtaining results the instructors should criticize their methods rather than the educability of the Natives. The first essential is that the Natives should believe what is told them and when it is realised that this means that their own ideas of disease must be removed and replaced by totally new conceptions it is clear that quick results cannot be expected and that long and patient work is necessary. But the

probability that this education may not be accepted by the mass of the people for generations should not prevent its inception. The alternative of leaving the public in ignorance of the mode of spread of the disease and the possible means of preventing that spread, is fatal to efforts to control disease (and especially tuberculosis) in the colonies.

It is one of the functions of sanatorium treatment in Britain to educate the patients so that they may continue sanatorium régime in their homes. This should be the routine procedure in all hospitals in Africa.

The treatment of Natives suffering from tuberculosis is at present inadequately provided for in East Africa. This is only to be expected in those countries in which general hospitals and doctors are far more scarce than in Britain. The record of the medical departments in the provision of accommodation and staff for general diseases is good, and progress is being continuously maintained. It is not surprising that attention has been particularly directed to the common and more easily curable diseases and that surgery and tropical diseases have been extensively studied and provided for. Recent reports from the colonies, however, have shown that tuberculosis now claims a place among those conditions which are of urgent importance.

It is interesting to compare tuberculosis with leprosy. Leprosy largely on account of the fact that it is easily recognized and that its results are visible and terrifying has acquired a reputation which is well known to Natives, and through biblical literature, to Christians from their childhood. It has caught popular imagination, with the result that the British Empire Leprosy Relief Association exists and countless settlements for leprosy patients are scattered over the colonies while some Governments maintain research workers to study the disease. Tuberculosis more insidious less obviously harmful, is far more widespread and fatal in the colonies is increasing, and is an altogether more serious problem. Yet arrangements for dealing with it do not compare in expense or extent with those existing for the control of leprosy.

The treatment of tuberculosis even in Britain is often only partly successful, and yet millions of pounds are rightly spent on it. The treatment in Natives must necessarily be less successful than in Britain for many years. But it must be given. It is almost useless to preach prevention to Natives unless treatment is given and the more successful the treatment in a disease like tuberculosis in which it can never be absolutely successful, the more will the Natives appreciate the importance of prevention.

It is therefore necessary that as far as possible the Natives should be able to receive the most efficient treatment known to modern medicine and since the majority of Natives live too far away from the cities where alone specialization is generally possible it is evident that as far as possible the modern treatment which in Britain is in the hands of specially trained doctors must in the colonies be undertaken by general medical practitioners, whether in charge of general hospitals or in private practice.

At little expense, wards for tuberculous patients can be provided. If they do not already exist in most general hospitals and the cost of apparatus other than X-ray plants is not great. In particular collapse therapy in pulmonary tuberculosis can be much more widely applied than at present.

It is therefore of the utmost importance that all practitioners in the colonies should realize that it is their duty, so far as possible to give modern treatment to suitable cases and to attempt the prevention of the spread of the disease. Colonial doctors deal successfully with many conditions which would in Britain be referred to specialists and there is no reason why tuberculosis should not be recognized as one of these. A defeatist attitude is fatal. As a corollary to this argument it is evident that facilities for the instruction of general medical officers and practitioners should be available and a short course conducted in England by experts interested in and experienced in colonial conditions would be a desirable step in this direction. Such a short course is not yet available though the longer course started in Cardiff by Professor S. Lyle CUMMINGS covers the whole ground.

The alternative is the present position in which the treatment given is almost useless and to the patient appears to be negligible. These patients can retain little confidence in their doctors and it is therefore difficult to induce them to believe in methods of prevention even in those few places where these are taught.

If the doctors of general hospitals feel themselves to be incompetent in the matter of the treatment of tuberculosis or do not possess X ray facilities it is not inconceivable that periodical visits to their hospitals by specialists in tuberculosis equipped with portable X ray apparatus would solve the problem. The Medical Officers and General Practitioners are undoubtedly capable of continuing pneumothorax refills under the occasional guidance of specialists.

Such specialists could undertake the examination of suspicious persons and contacts and any epidemiological work required and could with the aid of films and demonstrations give lectures to suitable groups of people.

To maintain the efficiency of treatment it is necessary that the patients be treated for long periods and much of this time will necessarily be spent by the patients in their homes. It is therefore desirable that the doctors and specialists be assisted in their work by subordinate staff who will visit the homes and maintain contact between the patients, their families and neighbours and the medical staff. These persons of the subordinate staff could see to what extent precautions against contact are taken in the patients' homes. The existing staff of sanitary inspectors could undertake much of this work and in Tanganyika Territory there are some who do so now.

The above remarks refer principally to the treatment of pulmonary tuberculosis. Non pulmonary tuberculosis is not so serious to the patient or dangerous to others and on the whole is much more efficiently treated at present than pulmonary disease.

The *provision* for cases of tuberculosis is a matter which is at present attended to in certain colonies to the extent of relieving them of tax payment. It occasionally happens however that such patients only attend at hospital when renewal of the exemption certificate is due. They accept no treatment and are medically uncontrolled. Exemption from tax does not remove the necessity for earning a living and although this is not so great a matter in an agricultural or pastoral area where wives and children can do the necessary work, it is important in other communities.

At present in Tanganyika Territory a tax-paying man found to be suffering from tuberculosis is given exemption from tax, and is usually





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<sup>10</sup> BERTONI (1941) 194

<sup>11</sup> DODERO (1937) 185 [17 refs.]

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### iii. Pathology

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DERO ... Amer J Public Health 1937 Dec. Vol. 27 No. 12  
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Harder—C R Soc Biol 1938. Vol. 127 No. 8

treatment has been carried out by DODEROS<sup>22</sup>. The highest titres were found when formulae which included cords which had been only slightly dried (0 1 and 2 days) were employed. He also found that when 3 parts of the serum neutralized 1 part of fixed virus, inoculated rabbits were not invariably protected, but when the titre was 5 to 1 there was evidence of better protection.

#### iv Methods of Treatment and Statistics.

As promised WEBSTER<sup>23</sup> now presents results regarding the efficacy of tissue culture virus as a vaccine (this *Bulletin* 1938, Vol. 35 p 186, and 1937 Vol 34 p. 671). "One-quarter cc. of the undiluted culture equal to 80 000 intracerebral lethal doses [mice] was harmless when injected intraperitoneally and protected them [mice] in 14 days against a test intracerebral injection of 1 000 lethal doses of mouse brain virus. One-tenth of this amount of culture vaccine was likewise effective but 1/100 containing only 800 lethal doses was insufficient for immunization. Immunity when produced, endured at least 9 months and was accompanied by protective antibodies."

Attempts were then made to immunize beagle puppies. For them the minimum lethal dose of mouse-brain virus was found to be 1 cc. of 1 in 1 000 dilution. Dogs were vaccinated with relatively small amounts of culture virus, 5 000 to 20 000 mouse lethal doses, barely 20 times that required to immunize mice. The vaccine has proved harmless to all 45 dogs thus far treated and has immunized them as follows. In the first test 7 of 7 vaccinated dogs resisted 1 lethal dose of test alkali virus given 3 weeks later. In the second test 4 of 4 vaccinated dogs resisted 1 lethal dose and 1 of 3 10 lethal doses. In the third test 3 of 3 vaccinated dogs resisted 1 lethal dose and 2 of 3 10 lethal doses. In all 14 vaccinated dogs all resisted 1 lethal dose fatal to 9 of 11 controls. This difference is statistically significant. Likewise 3 of 8 vaccinated dogs resisted 10 lethal doses. The 15 000 mouse lethal doses of culture vaccine which immunized dogs against 1 test lethal brain dose can be contained in 1 cc. and can be increased apparently without harm to 1 000 000 mouse lethal doses. With a larger amount of mouse lethal doses in the vaccine, a greater resistance is expected.

This evidence that dogs can be successfully immunized with a single injection of culture virus concludes our present report. Further experiments aimed at reducing still further the virulence of culture vaccine without destroying its immunizing potency are now in progress and will be submitted in the near future.

Further study of the effects of phenol on fixed virus have been made by LÉPINE and SAUTTER<sup>24</sup>. It will be remembered (this *Bulletin* 1938 Vol 35 p 173) that in spite of the fact that their results showed no significant difference in the immunizing properties of phenol

<sup>22</sup> DODEROS (J.) Recherche des substances rabieses chez les rongeurs traités — Bull. Soc. Méd.-Chir. Indochine 1937 Aug-Sept. Vol 18 No. 7 pp 748-764 With 1 folding chart

<sup>23</sup> WEBSTER (Lashie T.) Experiments on Anthracis Vaccination with Tissue Culture Virus — Amer. J. Public Health 1938 Jan Vol 28 No. 1 pp 44-46

<sup>24</sup> LÉPINE (P.) & SAUTTER (V.) État du virus fixe dans les vaccins anthraciques phénolés — C. R. Soc. Biol. 1938 Vol 127 No. 3 pp 192-194 With 1 fig

vaccines heated at 37°C for 24 hours and those kept at 20°C and because no accidents occurred amongst a number of animals so small that in the opinion of the authors they were insufficient for absolute conclusions to be drawn they concluded provisionally that it was advisable to use a vaccine kept at 20°C in preference to one at 37°C. for 24 hours. They now point out that all emulsions containing 1 per cent phenol and kept for 24 hours at 22°C retain their activity up to 6 months. The vaccine is in their opinion still living though it is stated to be practically inoffensive. The addition of phenol to a virulent emulsion is simply one way of ensuring a certain and progressive attenuation of the virus. [It would appear that the authors are now in a position to withdraw the conclusion of their previous paper and that they like the Indian workers in order to avoid risk would recommend heating of the vaccine for 24 hours at 37°C before use]

In a paper dealing with the statistics of rabies in Tonking DODERO<sup>25</sup> reports some interesting facts. From the following figures

	Percentage Mortality during		
	1st month	2nd month	3rd month
Face—			
Treated	93	7	0
Untreated	57	43	0
Upper limb—			
Treated	55	40	5
Untreated	50	37.5	12.5
Lower Limb—			
Treated	36	43	21
Untreated	11	64.5	23.5

he concludes that the effect of treatment is to shorten the incubation period. [The actual numbers on which the percentages are based are given (see below) for the untreated but unfortunately are not given for the treated.] The mean incubations in days of persons bitten on the various localities according to age groups are as follows —

	Face	Upper limb	Lower limb
Adults	20	29½	50½
Infants	20½	32	41½

Those for the two sexes were found to be —

	Face	Upper limb	Lower limb
Males	22	34	50
Females	22	28	55

<sup>25</sup> DODERO (J.) Durée d'incubation de la rage chez les Tonkinois — *Bull Soc Med.-Chirurg Indochine* 1937 Aug Sept. Vol. 18 No. 7 pp. 764-776 With 1 chart.

A table which may be useful for reference gives the incubation periods of 40 untreated persons —

Incubation in days

	16-20	21-30	31-40	41-50	51-60	61-80	Total
Face	4	0	2	1	0	0	7
Upper limb	3	5	4	2	0	2	16
Lower limb	0	2	4	2	3	4	17

(Unfortunately as above stated, a similar table for the treated is not given.)

JACOTOT<sup>26</sup> reports incubations of 4 5 6 and 7 months amongst guinea-pigs which had been subjected to a test dose of street virus after preliminary antirabic treatment. The periods for untreated control animals varied from 11 to 30 days.

Four consecutive passive protection tests against street virus in white mice are reported by HOYT and GURLEY<sup>27</sup> (See also this *Bulletin* 1936 Vol 33 p 323) The tests included a total of 60 treated and 70 control mice. Of the untreated all developed rabies and died, the mean incubation period being 10.6 days. Of the treated 43 per cent. were alive at the end of 3 weeks. The antiserum used was from rabbits and goats.

In a second communication<sup>28</sup> they report a further test which may be summarized as follows —

Serum given	Total No of mice	Survivals	Percentage survivals	Mean incubation in days
1 day before virus	21	21	100	—
2 hours after virus	19	19	100	—
1 day "	18	16	89	25.3
2 days "	21	19	90	26.0
4 "	20	11	55	23.6
Controls, no serum	31	3	10	15.3

In this case rabbit serum was used, and in all the tests the protecting dose was administered intraperitoneally and the test dose intracerebrally.

<sup>26</sup> JACOTOT (II) Quelques cas remarquables de prolongation de la période d'incubation chez des cobayes inoculés de rage des rues, après vaccination — *C R Soc Biol* 1937 Vol 126, No. 52 pp 849-851.

<sup>27</sup> HOYT (Anson) & GURLEY (M. Katherine) Experimental Street Virus Rabies in White Mice. Studies on Passive Immunization. I — *Proc Soc Experim Biol & Med* 1937 Dec Vol 37 No 3 pp 454-455.

<sup>28</sup> HOYT (Anson) & GURLEY (M. Katherine) Experimental Street Virus Rabies in White Mice. Studies on Passive Immunization. II — *Proc Soc Experim Biol & Med* 1938, Feb Vol 38 No 1 pp 40-42.

The statistical material collected by the Health Section of the League of Nations and analysed by MCKENDRICK<sup>23</sup> continues to accumulate and it may now be said that one of the most important problems discussed at the Paris Conference has been answered. The essence of the Pasteurian method of treating rabies lies in the preparation of a standardized strain of virus attenuated in the sense that it has lost virulence as a subcutaneous inoculum (fixed virus). Variations of the form in which the virus is administered for purposes of treatment have apparently little effect upon its immunizing properties but they affect very sensibly the risk which the patient runs as the result of that treatment. There is as yet no definite evidence that when suitable doses are employed a living vaccine is more effective than a dead one whilst there is unassailable evidence that the risk run from treatment by the former is much greater than from treatment by the latter.

The evidence upon which these conclusions are based rests upon the data given in the following tables —

	Number treated	Deaths observed	Calculated*	Mortality %
<i>Europeans</i>				
1 Cords	53 773	77	82	0.14
2 Dilutions	61 080	108	93	0.18
3 Killed phenol	55 644	82	84	0.15
4 Live phenol	3 464	6	5	0.17
5 Fermi's Vaccine	6 500	13	10	0.20
6 Fermi's Serovaccine	390	0	0.6	0
7 Heated	98 145	154	141	0.17
8 Killed Ether	63 444	79	96	0.12
9 Mixed (a) †	49 636	60	75	0.12
10 (b) ‡	2 671	7	4	0.26
11 Yatren Vaccine	5 334	13	8	0.24
	395 151	599	593.6	0.15
<i>Non Europeans</i>				
1 Cords	56 044	341	351	0.61
2 Dilutions	1 777	16	11	0.90
3 Killed phenol	280 696	1 761	1 756	0.63
	338,517	2,118	2,118	0.63

\* Calculated from the mortality of the 11 groups

† Mixed (a) — dilutions plus in severe cases Alivisatos

‡ Mixed (b) — dried cords plus in severe cases Fermi's original vaccine.

The agreement between the calculated and the observed deaths is very close—differences as great or greater than those found between the different methods of treatment would be expected to occur amongst samples of an admittedly homogeneous population once in eight times in the case of Europeans and once in three in the case of the non Europeans.

<sup>23</sup> MCKENDRICK (A. G.) An Eighth Analytical Review of Reports from Pasteur Institutes on the Results of Anti-Rabies Treatment.—*Bull. Health Organisation* (League of Nations) 1933. Feb. Vol. 7 No. 1 pp. 1-42.



As regards accidents following treatment the state of affairs is very different as is shown in the following tables —

	Number treated	Accidents		Percentages		
		Total	Fatal	Total	Fatal	Non-Fatal
1 Cords	114,240	31	3	0.027	0.002	0.025
2 Dilutions	62,857	24	17	0.038	0.027	0.011
3 Killed Phenol	353,737	35	11	0.010	0.003	0.007
4 Live Phenol	3,464	0	0	—	—	—
5 Fermi's Vaccine	7,319	3	2	0.041	0.027	0.014
6 Fermi's Scro-vaccine	360	0	0	—	—	—
7 Heated	93,145	8	2	0.009	0.003	0.006
8 Killed Ether	63,444	8	3	0.013	0.005	0.008
9 Mixed (a)	49,656	26	3	0.052	0.006	0.046
10 Mixed (b)	2,671	1	0	0.037	0	0.037
11 Yatren Vaccine	5,334	3	0	0.056	0	0.056
	756,307	136	41	0.018	0.005	0.013

The probability that differences in total mortality as great or greater than those observed would occur amongst samples from a homogeneous population is in this case less than one in a million. These results may be roughly summarized as follows —

	Total Accidents	Fatal Accidents	Non-fatal Accidents
1 Cords	High	Low	High
2 Dilutions	High	High	Low
3 Killed Phenol	Low	Low	Low
5 Fermi's Vaccine	High	High	Average
7 Heated	Low	Low	Low
8 Killed ether	Low	Average	Low
9 Mixed (a)	High	Average	High
10 Mixed (b)	High	Low	High
11 Yatren Vaccine	High	Low	High

To press the matter home the author gives still another table —

	Number Treated	Accidents		Fatal Accidents	Percentages		
		Observed	Calculated		Total	Fatal	Non-fatal
1 Killed Vaccines	417,181	43	77	14	0.010	0.003	0.007
2 Live Vaccines	232,888	82	43	23	0.035	0.010	0.025
Heated Vaccines	93,145	8	17	2	0.009	0.003	0.006
Other	13,093	6	2	2	0.046	0.015	0.031
	756,307	136	139	41	0.018	0.005	0.013

Thus in selecting a method of treatment so long as the Pasteurian method of administering doses of a fixed strain of virus is adhered to one need not concern oneself about the immunizing properties of the particular method adopted but only with the risks to which the patient is subjected—these in the case of live vaccines are about 3 to 4 times as great as in the case of killed vaccines.

In the report for 1936 from Palestine<sup>20</sup> it is stated that since 1923 the antirabic vaccine manufactured at the Department's Central Institute at Jerusalem has been a modification of Semple's carbolyzed killed virus. The success attendant upon its use has justified its continued preparation and the need for alteration to any other form of Pasteurian treatment has never arisen. A policy of decentralization has been actively pursued and now treatment is administered at 38 outstations. In all 1,350 bitten persons have been fully treated and of these one has developed rabies. The percentage mortality is 0.07 as compared with 0.13 in 1933 0.48 in 1934 and 0.08 in 1935. A case of hydrophobia in an untreated person is reported its special interest being that the incubation period (face) was only 13 days. No complications or sequelae of treatment occurred during the year under review.

A report of the results of antirabic treatment at Shillong (India) for the year 1936 is presented by ANDERSON.<sup>21</sup> Thirteen deaths are reported amongst 1,825 persons treated during the year (0.71 per cent.) as compared with 11 out of 1,554 (0.70 per cent.) in the previous year. The vaccine was prepared from Paris fixed virus in 1936 and from Kasauli fixed virus in 1935. The author had hoped on the basis of animal tests that the Paris strain would have yielded better results. One case of post treatment accident occurred. The symptoms were those of a diffuse myelitis the condition of the patient after 13 months was considered stationary and no further improvement to be expected.

A statistical discussion of protection against rabies in Italy is presented by PETRAGNANI.<sup>22</sup> It appears that the number of persons treated in that country is steadily and rapidly declining. The author argues though on very slender evidence in favour of treatment by phenol vaccines.

#### V Rabies in Animals

An epidemic of rabies in the estate of Tachira (Venezuela) during the period 28th April to 31st July 1937 is reported by GONZÁLEZ.<sup>23</sup> Six fatal cases are described and a short résumé of the general characteristics of the disease is given.

<sup>20</sup> PALESTINE. DEPARTMENT OF HEALTH. ANNUAL REPORT FOR THE YEAR 1936 [Rabies pp 82-85]

<sup>21</sup> SHILLONG. KING EDWARD VII MEMORIAL PASTEUR INSTITUTE AND MEDICAL RESEARCH INSTITUTE. TWENTIETH ANNUAL REPORT FOR THE YEAR ENDING 31st DECEMBER 1936 [ANDERSON (L. A. P.) Director] [Rabies pp 1-4 15-34]

<sup>22</sup> PETRAGNANI. Protection contre la rage en Italie.—*Bull. Office Internat. d'Hyg. Publique* 1938 Mar Vol. 30 No. 3 pp 569-576 [With 5 graphs.]

<sup>23</sup> GONZÁLEZ (Alfredo J.) Anotaciones sobre un brote epidémico de rabia o hidrofobia en el Estado Táchira.—*Boletín Ministerio de Sanidad y Asistencia Social* CARACAS. 1937 Oct.-Nov. 2nd Year Vol. 1 Nos. 17 & 18. pp. 1144-1153

A report of how an outbreak of rabies was stamped out is furnished by HORDAY<sup>24</sup>. This occurred in the north west of the Bechuana Protectorate. The methods employed were drastic: an order was issued to destroy all dogs within a radius of five miles of an outbreak; a dog free belt was created. These measures "which in the end proved tantamount to a total destruction of dogs over a large area," succeeded in controlling what threatened to be a very serious outbreak and preventing further spread.

The veterinary aspects of the possibility of the control of rabies in India are discussed by WILLIAMSON<sup>25</sup>. This is a carefully reasoned article and covers a wide field. The problem of rabies control as it applies to India is beset with difficulties mainly of religious origin but that much can still be done is well brought out by the author.

JACOTOT and LE ROUX<sup>26</sup> have succeeded in infecting three peacocks by intracerebral injection of street virus. The symptoms were mainly those of paralysis but periods of hyperexcitability were also observed. Similar results were obtained in the case of pheasants<sup>27</sup>.

Two cases of the successful inoculation of rabies into squirrels are reported by PRITCHETT<sup>28</sup> from North Carolina U.S.A. In both the diagnosis was confirmed by laboratory tests.

Two cases of rabies in horses are reported by SMITH<sup>29</sup>. One of these had been given a 14 day course of Semple's vaccine 50 cc. being given daily.

Of 1100 dogs which have been inoculated intracerebrally with street or fixed virus REMLINGER and BAILLY<sup>30</sup> have observed only 4 cases which were refractory to rabies. Such refractory animals are very rare. Possible explanations of the nature of this immunity are considered.

The effects of prophylactic antirabic vaccination of dogs in general is discussed by DE CAMP<sup>31</sup> and in particular statistics of the results obtained in Detroit (U.S.A.) are given. Of 28,000 vaccinated dogs 10 contracted the disease whilst of a population of unvaccinated dogs estimated at 98,239 441 became infected. The death rates were thus 0.036 per cent. and 0.45 respectively. From these figures it may be concluded that an unvaccinated animal is 12.5 times more likely to contract rabies than a vaccinated animal."

<sup>24</sup> HORDAY (J.) Rabies—Bechuana Protectorate Ann. Med. & San. Rep. for Year 1934. Appendix E pp 44-45.

<sup>25</sup> WILLIAMSON (G.) Aspects of Anti-Rabies Vaccination of Dogs—Jl. Roy. Army Vet. Corps 1933 May Vol 9 No 3 pp 117-128.

<sup>26</sup> JACOTOT (H.) & LE ROUX (G.) Transmission de la rage au paon (*Pavo muticus* L.)—C. R. Soc. Biol. 1938 Vol 127 No 1 pp 18-19.

<sup>27</sup> JACOTOT (H.) Transmission de la rage au faisan (*Dendragapus Dend. B.P.*)—C. R. Soc. Biol. 1938 Vol 127 No 2 pp 131-132.

<sup>28</sup> PRITCHETT (H. D.) Rabies in Two Gray Squirrels—Jl. Amer. Vet. Med. Assoc. 1938 Apr Vol 92 No 4 pp 563-564.

<sup>29</sup> SMITH (R. K.) Rabies in Horses—Jl. Roy. Army Vet. Corps 1933 Feb. Vol 9 No 2 pp 90-91.

<sup>30</sup> REMLINGER (P.) & BAILLY (J.) Les chiens naturellement réfractaires à la rage—Ann. Inst. Pasteur 1933 Feb Vol 60 No. 2 pp 195-200.

<sup>31</sup> DE CAMP (C. E.) The Prophylactic Vaccination of Dogs against Rabies in a Public Health Program—Jl. Amer. Vet. Med. Assoc. 1937 Nov Vol 91 No. 5 pp 561-567 [15 refs.]

VI. *Post Vaccinal Paralysis*

REMLINGER<sup>42</sup> discusses the statistics of fatal and non fatal paralytic accidents given by MCKENDRICK in his 7th review of reports from Pasteur Institutes collected by the Health Section of the League of Nations (this *Bulletin* 1937 Vol 34 p 676) and lays stress on the fact that the proportion of accidents is high and usually fatal (75 per cent) after treatment by the dilution method. The reason for this he describes as follows. Under the influence of passage from rabbit to rabbit the number of germs contained in the fixed virus progressively increases. Consequently—dilution being a method not of attenuation but of repartition—the virus becomes less sensitive to this dilution. Treatment in place of commencing with emulsions of limited virulence is thus commenced with products which are frankly virulent and this is followed by products of still higher virulence. He suggests that in institutes where Högyes method is employed new formulae should be instituted based upon experimental evidence regarding the effect of dilution upon the virus in question.

In a second paper this thesis is followed in greater detail and is further elaborated. REMLINGER<sup>43</sup> lays stress on the fact that accidents are four times as frequent with living vaccines as with dead vaccines.

This proportion of 4 to 1 must be taken into serious consideration.

The histological appearances in three cases of paralytic accident are described by MARINESCO and DRAGANESCO<sup>44</sup>. A discussion of the aetiology of these accidents follows (in which the reviewer is quoted as favouring an anaphylactic origin a view which HARVEY and he put forward as a mere suggestion some 30 years ago).

VII. *Miscellaneous*

The effect of antirabic treatment upon the course of nervous leprosy has been examined by TISSEUIL and GUILHAUMOU<sup>45</sup>. As a result of 3 tests they conclude that whilst temporary amelioration of general condition fading of leprosy nodules and cicatrization of some ulcers have been observed the effects are merely those of a simple bio-therapy.

AMATO<sup>46</sup> reports that from controlled experiments he finds that fixed virus is destroyed *in vitro* by ascorbic acid. A G McKendrick

<sup>42</sup> REMLINGER (P). Les accidents paralytiques du traitement antirabique par la méthode d'Högyes et leur cause.—*Bull. Office Internat. d'Hyg. Publique* 1937 Nov. Vol. 29 No. 11 pp 2354-2358.

<sup>43</sup> REMLINGER (P). Deux cent deux accidents paralytiques du traitement antirabique.—*Bull. Acad. Méd.* 1937 Dec. 7 101st Year 3rd Ser Vol. 118. No. 37 pp 419-432 [2 refs.]

<sup>44</sup> MARINESCO (G) & DRAGANESCO (Stato). Contribution à l'étude des accidents post vaccino-rabiques (à l'occasion d'un cas avec examen anatomo-clinique).—*Ann. Inst. Pasteur* 1938 May Vol. 60 No. 5 pp 477-498. With 11 figs. [21 refs.]

<sup>45</sup> TISSEUIL (J) & GUILHAUMOU (F). Essai de traitement de la lèpre nerveuse par le vaccin antirabique.—*Bull. Soc. Path. Exot.* 1937 Nov 10 Vol. 30 No. 9 pp 751-755.

<sup>46</sup> AMATO (G). Azione dell'acido ascorbico sul virus fisso della rabbia e sulla tossina tetanica.—*Giorn. di Bacteriol. e Immunol.* 1937 Dec. Vol. 19 No. 6 pp 843-849 [19 refs.] English summary (6 lines).

## MALARIA.

- OVERBEEK (J. G.) & STOKER (W. J.) Malaria in the Netherlands Indies and its Control.—*Jl Malaya Branch Brit Med Assoc.* 1938. Mar. Vol. 1 No. 4 pp. 281-304 With 21 figs. (2 maps)

This paper contains no original observations. It is an interesting and informative account of the importance of malaria in the Netherlands East Indies and its epidemiology. Reference is made to many of the numerous important contributions to malariology that have emanated from Java. The story of the progress realized in the control of the disease, especially along the lines of species sanitation is well re-told. A list of the anophelines found in the Netherlands East Indies is given together with notes concerning the biology, geographical distribution and pathogenicity of those species that are of chief importance as vectors of malaria. Photographic illustrations add to the interest of the paper.

Norman White

- MAZZA (Salvador) BASSO (Germinal) & CARDOZO (Arturo) Investigaciones sobre paludismo en las provincias Andinas. I. Comprobación de paludismo autóctono en el Dep. Rivadavia, Provincia de Mendoza. [Indigenous Malaria in Rivadavia Department, Mendoza Province, Argentine].—*Universidad Buenos Aires. Misión de Estudios de Patología Regional Argentina* July 1938. Publicación No. 35 pp. 3-15 With 8 figs.

- & BASUALDO (Carlos) II. Caso autóctono de paludismo comprobado en el Dep. Albardón Prov. San Juan. Presencia de *Anopheles pseudopunctipennis* en la región. [Case of Malaria in Albardon Department, San Juan Province, Argentine. *A. pseudopunctipennis* found in the Neighbourhood.].—*Ibid.* pp. 17-20 With 1 fig.

Both these reports deal with the occurrence of a case, or cases of malaria in districts in which that disease has been either absent or extremely rare. Two children in Rivadavia suffered from virus infections acquired locally: no anophelines were found. The nearest possible breeding place for anophelines was four kilometres distant. The case in Albardon was also a virus infection. Prolonged search failed to reveal any other infected persons. In a house adjoining that of the patient several *A. pseudopunctipennis* were found, one of which harboured sporozoites.

N IV

- SIYALINGAM (V.) Observations on the Malaria Epidemic in Watawala District during the Ceylon Malaria Epidemic 1934-35 and its after History.—Reprinted from *Jl Ceylon Branch Brit. Med Assoc.* 1938. Vol. 35 No. 1 26 pp. With 2 maps & 11 charts [10 refs.]

- MURRAY (David R. P.) Problems concerning the Efficiency of Oils as Mosquito Larvicides. Part I. The Stability of Oil Films on the Surface of Water.—*Bull. Entom. Res.* 1938. Mar. Vol. 29 Pt. 1 pp. 11-35 With 4 figs.

Films of oil which have originally covered the whole of the surface of an area of water frequently break up and leave the oil only in patches, and the rest of the surface uncovered. An investigation has revealed that this may be the result of either or both of two circumstances.

It has been shown that instability may result from —

I Certain relationships between the volatility of the aromatic and aliphatic hydrocarbons composing the oil mixture

II The presence of certain polar substances dissolved in the oil.

I The volatility relationships which determine the stability or instability are as follows —

(a) If the aromatic hydrocarbons are more volatile than the aliphatic a tendency exists for the oil to become concentrated into one central thick lens with the rest of the surface uncovered by oil

(b) If the whole of the aromatics are more volatile than the whole of the aliphatics, this action is very rapid and occurs whatever the proportion of the mixture.

(c) If the difference in the volatility is only small the phenomenon is only observed when the proportion of aromatics to aliphatics is very near to unity

(d) If the boiling range of the aromatics overlaps the boiling range of the aliphatics (as occurs when two oils containing both types of constituents are mixed) the phenomenon is much less clearly defined

(e) Olefinic oils *eg* oils obtained by cracking behave like aliphatic oils in so far as this behaviour is concerned.

\* It is believed that these changes would not occur if the oil was extremely pure since lenses are only stable if subject to lateral pressure from an invisible film of contaminating material.

II The effect of polar materials can be summarised —

(a) Solutions of certain organic substances in oil tend to make unstable films on the surface of water rupture of such a film (by wind or other agitation) allows a unimolecular film of the added substance to spread at the air-water interface This forces back the oil film. The greater the agitation the less the area of surface eventually covered by oil. In this class of substances are fats fatty acids naphthenic acid (a natural constituent of petroleum) some sulphonic acids and cholesterol.

(b) Certain other substances act in a contrary manner They do not promote instability but actually counteract and, if present in sufficient proportion overcome the instability produced by the first type of substance. The substances falling in this group are all at present of unknown composition but include *cracked spirit gum* (a material derived by polymerisation of olefinic hydro-carbons) certain resins and some substance present in petroleum and remaining in the residue after distillation. The last of these acts as a natural stabiliser and masks the instability phenomenon to some extent in commercial oils. It is found in largest quantity in the undistilled residue of aromatic concentrates.

(c) The quantitative relationship between the stabiliser and the substances promoting instability is not linear Successive increments of stabiliser equalise larger and larger amounts of the other

(d) Long-chain molecules such as fatty acids are the most difficult to overcome by stabiliser Naphthenic acid is more easily counteracted cholesterol still more easily

The following recommendations can therefore be made as to the desirable composition of anti-malarial mixtures so far as film stability is concerned —

1 The oil should contain either a small aromatic content or a very high one it should not contain 50 per cent. aromatics unless they are very high boiling (e.g. of lubricating base fraction)

2 It should consist of a mixture of wide and overlapping cuts of oil.

3 It should not contain fats or fatty acids added as spread aids. If spread-aids are desired, resins should be employed.

BESSLER (C) Sulla protezione meccanica antianofelica con particolare riguardo ai vari tipi di retine metalliche. Contributo sperimentale. [Experimental Study of Different Types of Metal Gauze as a Protection from Anophelines.]—*Riv di Malariaologia* Sez. I. 1938 Vol. 17 No 1 pp 51-61 French summary

Over a period of seven years a comparison was made of 19 varieties of metallic gauze as a mechanical protection from anophelines in a malarious region with special regard to efficacy durability and cost. Best results were obtained with gauzes of steel aluminum bronze,

Monel metal and galvanized iron. The cost of steel, Monel and aluminum gauzes limits their applicability. Gauzes made of phospho-bronze brass and copper call for consideration of details such as the thickness of the wire and the freedom of the metal from impurities. With the exception of galvanized iron all the gauzes were satisfactory from the point of view of durability even in coastal regions. N II

TILLEMMA (S) De verspreiding van malaria door gezonde parasieten dragers [Spread of Malaria by Healthy Parasite Carriers.]—*Geneesk Tijdschr v Nederl Indie* 1938 Mar 29 Vol. 78 No 13 pp. 741-750

GIORDANO (Francesco) La dilatazione cardiaca nel cuore da malaria. Osservazioni cliniche e radiologiche su 824 militari ed operai rimpatrianti per malattia dall' A.O.I. (II nota sul cuore da malaria.) [Dilatation of the Heart in Malaria. Clinical and Radiological Observations on 824 Soldiers and Workmen repatriated on Account of Sickness from Italian East Africa.]—*Giorn Ital di Clin Trop* 1938 Mar 31 Vol. 2 NS No 3 pp 66-71-4 [32 refs]

Among the 824 patients that were observed 415 were suffering from malaria and 60 of these suffered from some form of cardiac disturbance.

The author concludes that malaria like many infectious and other tropical parasitic diseases, is capable of producing with noteworthy frequency toxic and circulatory changes in the myocardium. Of the symptoms produced by this myocardial involvement those of acute cardiac dilatation are the most important. A IV

BRACHTEL (Rudolf A) Malariafälle mit auffallend langer Latenzzeit. [Malaria Cases with Remarkably Long Latent Periods.]—*Dtsch Med Woch* 1938 May 27 Vol. 64 No. 22 pp 787-788.

Although in Bohemia indigenous malaria is practically absent a few sporadic cases occur in travellers from the Balkans or other

parts of the State where malaria is still prevalent. The common causes of relapse were absent in the cases recorded as these occurred in hot summer weather and quinine prophylaxis could be definitely excluded. The symptoms were often atypical but the diagnosis of malaria was established by the finding of B T rings in all except one case. The latency periods varied from 7 months to 1 year and in one patient symptoms disappeared following malaria treatment although he had not been exposed to infection for 7 years. Herpes labialis often described in such cases was absent. A case of malarial attacks 1 year after quinine prophylaxis is also recorded. The object of the note is to draw attention to the possibility of malaria in atypical febrile attacks

J D Fulton

HOUSIAU Polynévrites d'origine palustre [Malarial Polyn neuritis.]—*Bruxelles Méd* 1938 Apr 10 Vol 18 No 23 pp 768-767

A sailor aged 35 who had suffered for many years from occasional attacks of malaria complained of tingling at the extremities of the three radial digits of the right hand pressure on which caused acute pain—a case of neuritis of the nerve endings of the right radial nerve. An attack of *falciparum* malaria followed. Quinine was given and the pains disappeared in three days. There was no evidence of alcoholism, lead poisoning or other cause than malaria of polyn neuritis. N II

JUNIOR (Peregrino) & BRANDÃO (Pedro Paulo) Insuficiência suprarrenal no mpaludismo. Commentarios acerca de 10 casos clinicos. [Suprarenal Insufficiency in Malaria.]—*Brasil Medico* 1937 Oct. 16 Vol. 51 No 42. pp 1047-1058. With 2 figs [47 refs.]

This paper deals at some length with the literature of the involvement of the suprarenals in malaria infections and describes ten cases in which signs and symptoms appear to afford definite indications of such involvement. Symptoms of malaria which appear to indicate some pathological change in the suprarenals are asthenia arterial hypotension muscular pain and digestive disturbance symptoms which are all prominent in Addison's Disease. One of the authors' patients displayed the bronze pigmentation of the skin and mucosa characteristic of Addison's Disease which according to them is rare in cases of malarial affections of the suprarenals. The prognosis given adequate malarial treatment is much better than in cases of suprarenal insufficiency due to causes other than malaria. N II

HILL (Roy A.) The Use of Drugs in the Treatment of [sic] Prophylaxis of Malaria.—Reprinted from *Jl Med Assoc Georgia* 1937 Oct Vol. 28, No 10 pp 512-517 [18 refs.]

This paper read before a medical association discusses the advantages and disadvantages of quinine and atebrin respectively in the treatment and prophylaxis of malaria. The author considers that atebrin is the first drug that we have known that could possibly be used effectively in mass treatment and prophylaxis. A curative dose of atebrin can be given without interference with working efficiency. In the discussion of the paper Dr A. R. FREEMAN agreed with the author regarding the low toxicity of atebrin he had given



full doses to more than 1,000 studied cases of malaria and had had no evidence of toxicity. Dr M. E. WIXCHESTER also agreed that using atabrin one can control, if not eradicate malaria in a country he advocated the concurrent use of drainage, drug control, screening and culling.

Λ II

GLYK HUGHES (F.) LOURIE (E. M.) & YORKE (Warrington) Studies in Chemotherapy XVII.—The Action of Undecane Diamidine in Malaria.—*Ann Trop Med & Parasit* 1938. Apr 23. Vol. 32. No 1 pp. 103-107. With 3 charts.

It had been shown previously by the authors that of a series of drugs tested, n-undecane 1:11 diamidine exhibited the greatest trypanocidal powers and produced permanent cures in infected laboratory animals. The discovery was also of academic interest since the new drug has an entirely different chemical constitution from other trypanocidal substances. In the present paper experiments on the treatment of human malaria by the same substance are described. The patients were all neuro-syphilitics infected either by blood inoculation or by mosquito bites. Doses of 25 mgm of the drug have been given intravenously twice daily and double this dose by mouth without ill effects. In two cases 150 mgm. daily by mouth caused anorexia and nausea. No changes in the blood sugar urea or N.P.N. or in the urine were noted during treatment. The results obtained in eighteen cases of simple tertian and in one case of quartan infection are given in tables, showing the number of paroxysms before and after treatment and the day after dosage on which the blood became parasite free. All cases were heavily infected when treatment began and administration of the drug was followed generally after a further one or two paroxysms by cessation of febrile attacks and a slow disappearance of parasites from the peripheral blood. The asexual forms were most affected. Relapses have been noted at from 4-8 weeks following first treatment. The authors do not recommend the drug for treatment. The importance of the observations lies in the fact that a new type of antimalarial has been discovered.

J. D. Fulton

PIZZILLO (Giuseppe) Sulla cura di Maurizio Ascoli nelle infezioni malariche. Nota IX. Smergiamo adrenalino-chinino adrenalino e chinino-resistenza [Ascoli's Treatment. Combined Action of Adrenalin and Quinine. Adrenalin and Quinine-Resistance].—*Riv di Malariologia*. Sez. I 1938. Vol. 17. No. 1 pp. 29-36. With 6 charts. German summary.

The author describes six interesting cases of malaria in which fever persisted in spite of very thorough treatment with quinine. In all of them quite small doses of quinine given by mouth when associated with intravenous injections of adrenalin very rapidly brought the temperature down to normal. He believes that these favourable results are brought about by adrenalin making all the blood accessible to the action of quinine. This method of treatment is of particular value in quinine-resistant infections. In two cases the injection of adrenalin alone increased rather than diminished the fever changing its type from tertian to irregular remittant.

Λ II

HOOPS (A. L.) Clinical Prophylaxis with Atebrin on a Malacca Estate.  
—*Jl Malaya Branch Brit Med Assoc* 1938 Mar Vol 1  
No 4 pp 329-333

On an estate where anti-larval measures were only partially effective the weekly administration of atebrin to all members of the labour force succeeded in suppressing clinical manifestations of malaria. For continuous prophylaxis the doses recommended are —two tablets twice a week for four weeks and two tablets once a week thereafter

N IV

SWELLENGREBEL (N. H.) DE BUCK (A.) & KRAAN (H.) Further Investigations on "Healthy Human Carriers of *Plasmodium vivax* in North-Holland.—Reprinted from *Proc Roy Acad Sci Amsterdam* 1937 Vol 40 No 4 pp 368-374

By feeding *A. maculipennis atroparvus* on patients who had been infected with *Pl. vivax* Madagascar strain during the afebrile period following a series of paroxysms the authors have assessed the infecting power of persons harbouring differing numbers of parasites in their blood. Persons harbouring one parasite per 100 leucocytes can infect 60 per cent or more of anopheles which feed on them once even if no male gametocytes be found on the day of the infecting feed, provided gametocytes had been found at an earlier date and no salvarsan had been given. Carriers harbouring only one parasite to 1 000 leucocytes can infect but at a much lower rate.

During 1936 thirty-one families comprising 80 adults and 184 children were under observation. There were 6 good carriers (one parasite or more per 100 leucocytes) among 62 children who had malaria fever that year and 10 good carriers among 122 children who had no fever. There were 5 good carriers among 16 adults who had malaria fever that year and only one among 64 adults who had no fever. There were 3 carriers of male gametocytes among the 62 children who had malaria fever and 7 among the remaining 122 children. There were 2 male gametocyte carriers among the 16 adults who had malaria fever and 2 among the remaining 64 adults. It appears that adult carriers likely to cause heavy anopheline infection are more likely than are children to become conspicuous by an attack of malaria.

N IV

BOYD (Mark F.) CARR (Henry P.) & ROZEBOOM (Lloyd E.) On the Comparative Susceptibility of Certain Species of Nearctic and Neotropical Anophelines to Certain Strains of *P. vivax* and *P. falciparum* from the Same Regions.—*Amer Jl Trop Med* 1938 Mar Vol 18, No. 2 pp 157-163.

For these experiments *A. quadrimaculatus* and *A. punctipennis* from the colonies maintained at the Florida Station for Malaria Research and *A. albimanus* reared from ova sent by air from Cuba and Panama were used. The Nearctic strains of *P. vivax* and *P. falciparum* were the McCoy and Long strains maintained in the malaria therapy service and the Neotropical strains were obtained from patients in Havana. These Cuban strains were proved by super infection experiments to be immunologically distinct from the Florida

strains. The comparative experiments were made by applying to a suitably infectious patient two cages each containing not more than 20 anophelines of the species that were being compared. *A. quadri-maculatus* and *A. punctipennis* were both highly susceptible to infection by strains of *virax* and *falciparum* derived from their own as well as from the Neotropical region. *A. albimanus* was highly susceptible to infection by strains of *virax* and *falciparum* derived from Cuba but was refractory to certain strains from the Nearctic region. The inferences are drawn that the West Indian strains of *falciparum* and *virax* might spread if introduced into the south-eastern United States but that the United States strains would only spread to a very limited extent if at all, if introduced into Cuba or Panama. N 17

HO (Stephen M. K.) A Brief Mosquito Survey of Foochow Region, South China.—*Lingnan Sci. J.* 1937 Vol. 18 No. 4 pp. 579-584 [11 refs.]

A six weeks survey in July and August in and around Foochow resulted in the finding of twenty species of mosquitoes of which only two were *Anopheles* *hyrcanus* var. *sincensis* and *lindesayi*. The former was found breeding along the edges of running streams in the hills as well as in the stagnant water of rice-fields and ponds. On one occasion the larvae of this species were found in stone troughs containing clear rain water. Neither *A. minimus* nor *A. jayponensis* was found, though both these species have been reported from Nanking which is only 28 miles from Foochow. A list is given of the twenty species of mosquitoes found with notes of the breeding places of each. N 17

TOUMANOFF (C.) & HOANG TICH TRY. Nouvelle contribution à la connaissance de la faune anophélienne de la haute altitude du Tonkin (Chapa). [Anopheline Fauna in a Hill-Station of Tonking.] —*Bull. Soc. Méd.-Chirurg. Indochine* 1937 Oct. Vol. 15 No. 8 pp. 880-891. With 4 figs (2 coloured) on 2 plates. [12 refs.]

The hill-station of Chapa is a health resort. malaria is all but non-existent in striking contrast to Pho-moi at the foot of the hill below Chapa which is intensely malarious. At five surveys which were carried out in Chapa between 1931 and 1937 the spleen index of children varied between 0 and 3.43 and the parasite index between 0 and 6.81. People infected with malaria frequently go to Chapa and the anopheline fauna is varied, eleven species having been identified there. This is another example of anophelism without malaria. This is explained by the zoophile tendencies of the *Anopheles*. They can be found in large numbers in stables at night. Only few remain in the stables by day. Very rarely are anophelines to be found in human habitations. Fortunately there are numerous stables surrounding the town. Two forms of *A. jayponensis* have been found, the type form and *low-kienensis* & *condidensis*. The latter is an important vector in Tonking. *A. maculatus* also occurs. *A. lindesayi* was found, as was *A. giles* var. *batleyi*. Both are zoophile. Adults of the latter species are rare even in stables and it seems probable that it feeds chiefly on birds or other animals in the open. N 11

TOUMANOFF (C) Contribution à l'étude de la fréquence saisonnière des diverses espèces anophéliennes sur les hauts plateaux d'Annam et dans la basse et moyenne régions de la Cochinchine et du Cambodge. [Seasonal Prevalence of Anopheline Species on the Higher Plateaus of Annam and in the Lower and Middle Regions of Cochinchina and Cambodia.]—*Bull Soc Méd-Chirurg Indochine* 1937 Oct. Vol. 15 No 8 pp 970-980 With 3 charts

In spite of considerable differences in climate more especially with regard to temperature that characterize different parts of French Indo-China there is very little difference in the seasonal prevalence of the more important anophelines in the different regions. It would appear that rainfall is of more importance than other meteorological factors in determining such seasonal prevalence. *A. minimus* *A. aconitus* and *A. karwari* which are stream breeders are more prevalent in the dry than in the rainy season but this difference is less marked in the south than in the north. In the south *A. minimus* and still more *A. maculatus* are often found breeding in marshes as well. *A. vagus* and *A. kochi* both of which breed in stagnant water are more in evidence in the rains. *A. philippinensis* *A. fuliginosus* *A. maculipalpis* and, to a certain extent *A. dardirostris* and *A. tessellatus* have no marked seasonal prevalence they are adapted to certain permanent breeding places swamps, lakes marshes &c. which undergo but slight seasonal change. *A. hyrcanus* which is frequently found in the south is a stream breeder that is more in evidence in the dry season. Seasonal changes in hydrographic conditions are the most important if not the only factor in determining the seasonal prevalence of anopheline species in Indo-China. A II

BEKLEMISCHEV (W V) & ZHELOCHOVTSEV (A N) La répartition géographique d'*Anopheles maculipennis* Neig et de ses sous-espèces dans l'URSS [Geographical Distribution of *A. maculipennis* and its Sub-Species in Russia.]—*Med Parazit & Parasitic Dis* Moscow 1937 Vol. 6. No 6 [In Russian pp 819-833 With 4 figs. [41 refs.] French summary pp 833-835]

A study of the varieties of *A. maculipennis* distinguished by their egg characteristics has been going on in Russia since 1932. The results of this study are reported in this paper. *A. maculipennis* is a holarctic species and is found almost throughout the northern temperate zone of two continents. It is found as far north as the belt of coniferous forest and where this has been cleared it extends still farther north if the summer temperature is sufficiently high. In the continental climate of Russia the limit is as far north as 66°N. Its southern extension in Asia and Africa is determined by the heat of summer. The authors recognize five sub-species—*messeae* *typicus* *atroparvus-labbranchiae* *sacharovi* and *occidentalis*. *A. maculipennis melanoon* is apparently grouped with *messeae* and *subalpinus* is considered as probably a synonym for *melanoon*.

*A. maculipennis messeae* has the widest distribution. It is found throughout Europe except Spain and almost throughout Siberia. In eastern Europe and especially in Siberia it outnumbers all other species. It is indeed the only one of the sub-species found in Central and Eastern Siberia. It has not been found in Turkestan and its existence in Transcaucasia is doubtful.

*A. maculipennis typicus* is found throughout the north-east of the east European plain as far as the Urals. It has not been found hitherto in the south-east of that plain (Orenbourg). It has been found in Tomsk, Western Siberia, and at the foot of the Altai Mountains, but it is rare. In the Caucasus Mountains it is the only representative of the species, but it does not apparently occur in southern Caucasus. It has been found on the Turkmeno-Persian frontier. In Eastern Europe it is most prevalent in the highest places of the plain. The Caucasian form differs considerably from the European form. The area of distribution of *typicus* extends further north-south than any of the other sub-species; this is possibly explained by its two-fold method of hibernation. In the north it passes the winter in a cold shelter and does not feed. In the south, like *labranchias* or *atroparvus*, it is found in a state of gonotrophic dissociation.

*A. maculipennis atroparvus* is found in the basin of the Dniester and along the Dniester on the northern shore of the Black Sea, on the shores of the Sea of Azov in the Southern Ukraine and in the steppes of Northern Caucasus. The northern limit of this sub-species coincides with the January isotherm of 7°C. It seems to be an essentially European variety, especially adapted to the temperate climate of the Atlantic.

*A. maculipennis labranchias* is hardly ever found in Russia.

*A. maculipennis sacharovi* is found throughout Turkestan, south of the Kirchiz Mountains and in the plains of Azerbaijan, of Eastern Georgia, of Armenia, and of Daghestan as far north as Akhatchkala. It is absent from the Pontic shore and from the coastal plain of Lenkoran, places characterized by a damp climate. A. W.

DE MEILLON (Botha). A Note on *Anopheles gambiae* and *Anopheles funestus* in Northern Rhodesia.—*Publications of South African Inst. Med. Res.* 1937, Nov. Vol. 7, pp. 308-312. With 1 sketch map. [Publication No. XL.]

The paper discusses the natural range of flight of these insects.

The author had reason to suspect that *Anopheles funestus* was flying down the wind into a village in N. Rhodesia, from a distance of well over a mile. This was confirmed by staining and releasing adults. Of about 2,000 *gambiae* and *funestus* 11 were recovered, all within 3 days of liberation. One had flown as far as 2.8 miles. It was observed that when stained adults were liberated about sunset they flew straight upwards for about 20 feet and then moved away down wind.

In the author's experience *A. gambiae* breeds in essentially the same types of water in widely separated parts of Africa. *A. funestus* also shows no tendency to develop different breeding habits in different areas. P. A. Burdon.

DE MEILLON (Botha). Some Reactions of *Anopheles gambiae* and *Anopheles funestus* to Environmental Factors.—*Publications of South African Inst. Med. Res.* 1937, Nov. Vol. 7, pp. 313-327. With 3 figs. [14 refs.] [Publication No. XL.]

The author refers briefly to some previous papers on the relation of adult *Anopheles* to light and atmospheric humidity.

An apparatus was made in which mosquitoes could be kept in a stream of air of which the humidity was controlled. When the finger was thrust into this apparatus it was found that *A. gambiae* would feed

over a very wide range of humidity at 28-29 C. A very few experiments also lead to the tentative conclusion that provided the mosquito can obtain blood every night it can survive continuous exposure to very low humidity (20 per cent at 26°C.)

Some preliminary experiments were also carried out in a chamber which offers a choice of humidity at one temperature. It was difficult to get consistent results but the experiments show that the mosquito's reaction to humidity is much influenced by its own state of nutrition

P A Buxton

HADJINICOLAOU (J) Observations on *Anopheles marleri* S & P (Diptera, Culicidae).—*Riv di Malarologia* Sez. I 1938 Vol. 17 No 1 pp 44-50 With 3 figs.

*A. marleri* was found breeding in numbers in a permanent stream on Mount Itis in central Greece at an altitude of 300 metres. Attempts at raising the larvae were successful in a cool basement in pans of water the temperature of which was kept between 19° and 24°C by means of an ice bath. The development from egg to adult was completed in 20 days. The larvae were first found in the latter half of June and could be found in abundance to the early part of October. During the summer months a hundred larvae could be collected in one dip. The eggs are uniformly black somewhat like those of *bifurcatus*. They have however larger floats than have the eggs of *bifurcatus* more than three quarters of the egg length. The width of the float at its broadest part is one and a half times the width of the ventral surface of the egg between the floats. *A. marleri* appears to feed rarely if ever on human beings and so can be of no importance as a malaria vector. A W

DE BUCK (A) Some Observations on the Salivary and Stomach Secretion of *Anopheles* and Other Mosquitoes.—Reprinted from *Proc Roy Acad Sci Amsterdam* 1937 Vol. 40 No 2 pp 217-223

This paper records the results of some interesting observations made on the secretions of the salivary glands and stomachs of *A. maculipennis*, *Th. annulata* and *C. pipiens*. The technique employed was simple. The salivary gland was put in a drop of distilled water on a slide and allowed to dry. After drying the residue was dissolved in a drop of saline solution. The author summarizes his observations as follows—

- 1 The haemagglutinin in the salivary secretion of *A. maculipennis* is present in the median acinus only.
- 2 This agglutinin is not destroyed by prolonged drying provided that the atmosphere it is kept in is absolutely dry nor by dry heating at 99°C. It is destroyed by wet heating at 50°C.
- 3 The salivary glands of *Th. annulata* contain a weak haemagglutinin.
- 4 The anti-coagulin in the salivary secretion of *A. maculipennis* is present almost exclusively in the median acinus.
- 5 The anti-coagulin of *A. maculipennis*, *C. pipiens* and *Th. annulata* is not destroyed by prolonged drying nor by dry heating at 99°C.
- 6 The anti-coagulin of *A. maculipennis* is not destroyed by boiling that of *C. pipiens* and *Th. annulata* is destroyed by wet heating at temperatures higher than 50°C.
- 7 The secretion of the posterior portion of the mid-gut of *C. pipiens* and *Th. annulata* contains a coagulin.
- 8 This coagulin is not destroyed by prolonged drying, nor by dry heating at 99°C. It is destroyed by wet heating at 50°C.

"9 The secretion of the lateral acini of the salivary glands of *A. maculipennis* seems to be responsible for the irritating and wheal-producing action of the saliva."

N 17

JACKSON (R. B.) A Guide to the Identification of the Anopheles Larvae of the Colony of Hong Kong. With Notes concerning them.—*Chinese Med. J.* 1938 Mar Vol. 53. No. 3 pp. 259-270 With 14 figs.

NANDI (B. K.) & DIKSHIT (B. B.) A New Colorimetric Test for Plasmoquine.—*Indian J. Med. Res.* 1938 Apr Vol. 25 No. 4 pp. 837-850 With 1 graph [24 refs.]

A new colour test for plasmoquine is described which detects this substance at a dilution of 1/1 000 000 and allows of quantitative estimation at the same dilution if a spectrophotometer be employed. Dilutions up to 1/200 000 can be quantitatively estimated by means of a Dubose colorimeter. The method is an application of Folin's phenol reagent originally developed for tyrosine and tryptophane. A few drops of the reagent added to an aqueous acid solution of plasmoquine and then made strongly alkaline with sodium carbonate gives a blue colour which deepens to a maximum in half an hour and remains constant for three hours. Pure reagents and blank determinations are recommended. The reagent is not specific for plasmoquine phenolic substances interfere but are not extracted by ether in the method employed and the test is not suitable for urine.

Tissues are weighed, cut and ground with silver sand, and 0.2 cc. of 20 per cent NaOH added per gram. After drying at room temperature, extraction is carried out in a Soxhlet with ether for 1½ hours. The ether extract is then washed three times with minimal quantities of 2 per cent sodium carbonate and the plasmoquine washed from the ether by 5cc. of 5 per cent HCl. The HCl layer is rendered ether free by heating on the water bath. To 4 cc. of the extract is added 1 cc. of the phenol reagent, and then solid sodium carbonate till strongly alkaline. 4 cc. of standard plasmoquine solution of approximately equal strength are similarly treated. Centrifuging is carried out if a precipitate is present, and the volumes then made equal, preliminary to colorimetric comparison. Blood can be treated in the same way 0.1 cc. of 20 per cent NaOH being added for each 1 cc. and for extraction it may be dried or done wet in a separating funnel with ether.

With blood *in vitro* up to 98 per cent. of the drug has been recovered and the time factor has no influence on the amount recovered. A perfused frog gave 59 per cent. recovery and another 63 per cent. after injection. Mice injected hypodermically showed a recovery of 62 per cent. from all tissues after 2 hours and 81 per cent. when killed after 15 minutes. The amount of drug recovered from rats and guinea-pigs twenty-four hours after inoculation was small, due to alteration of plasmoquine by the organism, it is supposed.

The colour developed obeys Beer's Law. A theory of the mechanism of the colour development in a non-phenolic substance like plasmoquine is given. It is suggested that the methoxy group is demethylated by the phenol reagent giving a free hydroxyl group and substitution by the methyl group at some other point of the molecule.

J. D. Fulton.

## HELMINTHIASIS

KHALIL (M) & AZIM (M Abdel) Further Observations on the Introduction of Infection with *Schistosoma haematobium* through the Irrigation Schemes in Asswan Province.—*Jl Egyptian Med Assoc* 1938 Mar Vol 21 No 3 pp 95-101 With 3 maps.

The introduction of perennial as opposed to basin irrigation has in certain villages tested increased the amount of infection with *S haematobium* from four to nearly forty fold in three years as shown by the accompanying table

	Rate of infection 1934	Rate of infection 1937
Seballa	10 per cent	44 per cent.
Kilh	7	50
Mansouria	11	64
Bimban	2 „	75

Factors governing the amount of increase are distance of irrigation canals from a village, time during which perennial irrigation has been in use freedom of canals from aquatic plants intake of silt from the Nile the deposit of which prevents flushing too short an interval (5 days) between rotations to allow of drying of the canals. Arrangements are now made for clearing the canals yearly making outflows into drains and abolishing dead ends  
Clayton Lane

ZAVATTARI (Edoardo) Ambiente fisico e schistosomiasi vescicale in Libia. [Environment and Vesical Schistosomiasis in Libya]—*Riv di Biol Colon* Rome. 1938. Feb Vol 1 No 1 pp 5-27 With 4 figs. [51 refs.] English summary (9 lines)

The distributions of *Bulinus contortus* and of vesical schistosomiasis correspond in Libya they are found in the Scati, Hofra and Agial depressions  
C L

MARTINS (A. Vianna) Contribução ao estudo do genero *Australorbis* Pilsbry 1934 [Contributions to the Study of *Australorbis* Pilsbry 1934] [Thesis.]—66 pp With 6 plates (1 coloured) [58 refs.] 1938. Belo Horizonte.

SHAW (A F Bernard) & GHAREEB (A Abou) The Pathogenesis of Pulmonary Schistosomiasis in Egypt with Special Reference to Ayerza's Disease.—*Jl Path & Bact* 1938. May Vol 46 No. 3 pp 401-424 With 32 figs. (2 coloured) on 13 plates. [25 refs.]

The unrealized importance of pulmonary damage as a cause of death in Egyptian schistosomiasis is emphasized by the statement that in 282 autopsies made on persons infected with *S mansoni* or *S haematobium* there were lesions in the lungs in 33 per cent and in 2 per cent. these were the cause of death the significance of this



conclusion is the greater when it is added that 80 per cent. of the 282 deaths were not caused by the infection.

In the main the lung damage was due to embolism by ova coming from female worms outside the lungs and filtered out in the arterioles, which accompany the bronchioles with their lumen of 50-100 $\mu$ , and the damage is greater and the likelihood of death increased as these embolic showers are heavier and more frequent. The lesions are of three classes, parenchymatous tubercles, focal arterial lesions and diffuse arterial damage or Ayerza's disease. Since the species of schistosome concerned cannot with certainty be determined by examination of sections, tissues from 38 of the bodies were soaked in 3 per cent KOH solution ova of *S. haematobium* were found in 69.4 per cent and of *S. mansoni* in 41.7 per cent so that in 11.1 per cent both parasites were present. Although sectioning is not reliable for species differentiation, it is clear that aerial sectioning played a great part in the forming of the conclusions reached.

Parenchymatous tubercles were present in 88 per cent. of autopsies they form about ova which have escaped from the arteriole accompanying a bronchiole. If the escape has taken place towards the bronchiole the tubercle projects into this if in the other direction into an alveolus it is 250-375 $\mu$  in diameter the tissue change is limited to it, and its end is a fibrous scar with carbon pigment round an ovum calcified or not, and this last can and does rarely appear in the sputum. Focal arterial lesions in the lungs in this infection are believed to be new observations. As the ovum becomes impacted necrosis of the intima and media takes place without cellular reaction, the ovum becomes imbedded in the necrotic tissue, endothelium grows over it and thickens, and it is not till the egg becomes extravascular that a tubercle forms the muscle is not repaired but aneurysms do not follow. In the thickened endothelium capillaries form become dilated into an angiomatoid formation, and the muscle coat hypertrophies proximal to the obstruction caused by the endothelial thickening. The lesions are irreversible. In 6 cases (2.1 per cent. of all cases of schistosomiasis and 6.3 per cent. of those in which there were egg-induced lesions in the lung) these pulmonary arterial lesions were so widespread as to constitute Ayerza's disease it is the result of repeated embolisms by eggs resulting in rows of tubercles marking out the outlines of vessels and later of the wholesale degeneration of the arteriolar walls leaving a naked eye appearance of the cut lung as of strands of silver wire the myohypertrophy of the larger pulmonary arteries continues in spite of the formation of angiomatoids and atheroma sets in the wall of the hypertrophied and dilated right ventricle may be thicker than that of the left and all these persons died of congestive heart failure.

In 10 cases there were worms themselves in the pulmonary arteries (3 per cent. of all bilharzial cases and 10.5 per cent. of those with pulmonary lesions) in 8 of them all the worms found were dead, in 1 all were alive and in 1 there were both sorts these were evidently there as emboli for they lay at bifurcations of arteries, perhaps with their ends trailing into the branches their death was followed by thrombosis and the collection of eosinophils, histiocytes and giant cells. When the worms lie in the systemic veins from the urinary system they and their eggs have a direct route to the right heart and lungs, when in the portal system they may escape being held up by the liver capillaries if collateral circulation has been open by dilatation of oesophageal veins or by vascular adhesions between liver and

diaphragm and it is suggested that an adhesive quality in eggs may allow them to become attached to the vascular wall even when they are not held up as blocking emboli. C L

KHALIL (M) & AZIM (M Abdel) On the History of the Anti-Bilharzial Campaign in the Dakhla Oasis — *Jl Egyptian Med Assoc* 1938 Mar Vol 21 No 3 pp 102-106 With 1 map

It appears that *Bulinus* snails have now been eliminated from the oasis and that infection with *S haematobium* is no longer occurring. The history began with the action of copper sulphate 5 parts per million acting for 5 days with disappearance of *Bulinus* [this *Bulletin* 1928 Vol 25 p 456]. They reappeared in 3 months and the process was repeated no *Bulinus* being found 6 months later. An intensive campaign of tartar emetic injections was put through and it was found that another canal communicating with that which had been coppered was bringing in *Bulinus*. It was obliterated and the other stream again treated with copper. Visits in 1930 1931 1932 and 1936 found no *Bulinus* though *Melania tuberculata* and *Limnaea truncatula* were prevalent. Moreover 70 children born since 1929 were uninfected, the relapse rate in previously treated persons was 34.5 per cent but symptoms were milder and the area of cultivation taken as a measure of working capacity had increased 25 per cent. C L

ASHKAR (M F) Investigations on an Outbreak of Jaundice in Tala. (Menoufia Province) — *Jl Egyptian Med Assoc* 1938 Mar Vol 21 No 3 pp 131-137

An outbreak of jaundice in February to April might it was evidently suspected be due to tartar emetic injections but the same bottle of the drug had been used elsewhere without ill-effects and analysis of it showed no impurities. The jaundice was of the parenchymatous type and associated with fever and enlargement of liver and spleen so suggesting an infection which was however not traced. C I

MUELLER (Justus F) The Life History of *Diphyllobothrium mansonoides* Mueller 1935 and Some Considerations with Regard to Sparganosis in the United States. — *Amer Jl Trop Med* 1938 Jan. Vol. 18 No 1 pp 41-66 With 37 figs on 8 plates. [17 refs.]

*D mansonoides* may be the source of sparganum infections in America. When Mueller described *D mansonoides* as a separate species reported from cats and perhaps from a dog [this *Bulletin* 1935 Vol. 32 p 655] he wrote of it thus —

*D mansonoides* differs from *D mansoni* as follows. The bothria are different in that their free edges are poorly developed whereas those of *D mansoni* are flourishing and the width of the scolex is only 0.2 to 0.5 mm. as against 0.4 to 0.8 mm. for *D mansoni*. A cross section of the scolex in *D mansoni* makes a square in my material an oblong

"The nerve trunks of *D. mansoni* are considerably more lateral as figured by Joyeux and Houdemer than they are in *D. mansonioides*. Calcareous corpuscles are abundant in *D. mansoni* rare in my worm. The vagina of *D. mansoni* is laterally winding but does not deviate from the median course in my material furthermore the vagina of *D. mansoni* communicates directly with the exterior without the terminal vestibule found in my species.

The uterus makes three large anterior loops in *D. mansoni* according to Joyeux and Houdemer four and one-half according to Faust, Campbell, and Kellogg and has no specialized terminal bulb. In *D. mansonioides* the uterus has only two large terminal loops, and a muscular terminal compartment set off by a sphincter. Since the anatomy of the uterus is absolutely constant in all my material there is no ground for assuming that this difference can be explained as variation.

The egg of *D. mansoni* hatches in 31 days (Okumura, 1918) that of my material in not less than 50.

In the present paper the author states that —

In the widespread region where this worm affects native wild-life man must be constantly exposed to infection with cercariae wherever drinking water from natural sources is used. It is certain that infected Cyclops are widely scattered in natural bodies of water with the inescapable consequence that these must occasionally be swallowed by man when drinking from or possibly while swimming or bathing in such waters.

C. L.

JOYEUX (Ch.) & BARR (J. G.) Sur le développement des *Pseudophyllides* (Cestodes). [The Development of Pseudophyllidea.]—*C. R. Soc. Biol.* 1938 Vol. 127 No. 13 pp. 1265-1266.

BACIGALUPO (Juan) Nuevo huésped intermediario de la *Hymenolepis diminuta* (Rudolphi 1829) *Embia* (Rhagadachur) Argentina, Navas. [*Embia argentina* a New Intermediate Host of *Hymenolepis diminuta*].—*Rev. Med. Trop. y Parasit.* 1938 Jan.-Feb. Vol. 4 No. 1 pp. 45-47. With 1 plate.

The author mentions *Dermestes vilpinus*, *D. parvicornis* and *Ulosoma parvicornis* as new intermediate hosts of *H. diminuta* but the first has not proved to be able to carry the development beyond a certain stage, the two latter are common hosts. He now names a fourth *Embia argentina*. Of two specimens allowed to feed on matter containing ova of the worm obtained from grey rats, one died after twelve days and in it were found immature larval stages, the other died after 45 days and in its body cavity were completely developed cercocysts of the worm. [Other insects in which this stage has been seen are *Asopia* (*Pyralis*) *fernalis*, *Anisolepis annulipes* and larvae in *Ahis spinosa*, *Scaurus striatus* and certain fleas, *Neosorvulus fasciatus* and *Xenopsylla cheopis*.]

H. H. S.

MAY (Herbert) Ueber Wurmerkrankungen. [Helminthiasen.]—*Med. Klin.* 1938 Mar. 23 Vol. 34 No. 12 pp. 402-403.

At Lehr in Baden, examination of stools from 828 persons apparently by smear disclosed these infections: *A. lumbricoides* 148, *T. trichiura* 100, *E. vermicularis* 7, tapeworm 1. The number in whom infections were found was 223.

C. L.

COCHAUX (I) *Helminthiasis associées aux avitaminoses* Le nzadi ou lupusu des indigènes du Kasai. [Helminthic Infections associated with Avitaminoses. The Nzadi or Lupusu of the Natives of Kasai.]—*Ann Soc Belge de Méd Trop* 1937 Dec 31 Vol. 17 No 4 pp 491-500

Nzadi or lupusu is defined as a syndrome of bodily deficiency ending sooner or later in death caused by heavy infection with hook worms or ascarids combined with avitaminosis. C L

KELLER (A E) LEATHERS (W S) & KNOX (J C) The Incidence and Distribution of *Ascaris lumbricoides* *Trichocephalus trichinura* *Hymenolepis nana* *Enterobius vermicularis* and *Hymenolepis diminuta* in Seventy Counties in North Carolina.—*Amer J Hyg* 1938 Mar Vol 27 No 2 pp 258-274 With 1 map

The authors conclusions based on examination of 0.005 gm of faeces in decinormal caustic soda solution are as follows

1 Of a total of 37,346 specimens of feces obtained from white persons in 424 communities in seventy counties of North Carolina 3.542 (9.5 per cent.) were found to contain eggs of *Ascaris lumbricoides*

2 The incidence of ascaris in North Carolina prior to 1921 was 5.5 per cent. in 36,930 examinations.

3 In the Coastal Plain the incidence of ascaris was 6.5 per cent. in 19,294 examinations 3.9 per cent. in 12,170 examinations from the Piedmont Region and 30.7 per cent. in 5,924 examinations from the Mountain Area.

4 The average intensity of infestation for all the positive cases was 11,800 eggs per cc. of feces and did not show much variation even though the incidence of this parasite varied markedly in the different divisions of the state.

5 The incidence of hookworm in North Carolina in relation to geographical divisions of the state was found to be the reverse of that of ascaris

6 The incidence of ascaris according to age was highest in the age periods 0 to 4 5 to 9 and 10 to 14 years.

7 Of the total number of positive cases of ascaris 71.1 per cent. were classified as very light 24.2 per cent. as light infestations and 3.5 per cent. and 1.2 per cent. as moderate and heavy respectively

8 In an analysis of 1,794 families in which one or more persons were found to be infested with ascaris, the average worm burden per infested individual increased as the number of infested persons per family increased

9 Of a total of 4,958 positive specimens in both white persons and Negroes 36.5 per cent. contained unfertilized eggs only with an average intensity of infestation of 2,100 eggs per cc. of feces 25.5 per cent. contained fertilized eggs only with an average intensity of infestation of 11,800 eggs per cc. of feces and 38.0 per cent. contained both unfertilized and fertilized eggs with an average intensity of infestation of 33,100 eggs per cc. of feces

10 Of 6,301 specimens of feces secured from Negroes residing in 63 communities in 37 counties 1,418 (22.5 per cent.) were found to contain ascaris eggs.

11 The incidence of ascaris in white persons in the same counties from which specimens from Negroes were secured was 7.0 per cent. in 16,904 examinations as compared with 22.5 per cent. in 6,301 Negroes.

12 The intensity of infestation in Negroes was 27,000 eggs per cc. of feces, as compared with an average of 15,700 eggs per cc. of feces for white persons living in the same area.

" 13 In white persons 194 (0.5 per cent) of the 37,346 specimens examined contained eggs of trichocephalus. The incidence of trichocephalus in the Coastal Plain was 0.3 per cent., in the Piedmont Region 0.5 per cent and in the Mountain Area 2.0 per cent. The average intensity of infestation was 1,400 eggs per cc. of feces.

14 Of the 6,301 specimens examined for Negroes 3.0 per cent. were found to contain eggs of trichocephalus. A high incidence of trichocephalus in Negroes was found in the following coastal counties: Hyde 24.4 per cent. Craven 23.6 per cent. Tyrrell, 14.8 per cent. Carteret 14.2 per cent and Washington 10.7 per cent. The average intensity of infestation in Negroes was 1,500 eggs per cc. of feces.

15 The incidence of *Hymenolepis nana* in the total population in white persons was found to be 0.7 per cent and among the negro population examined it was found to be 0.27 per cent.

" 16 Of the total number of specimens examined from white persons 230 (0.7 per cent) contained eggs of *Enterobius vermicularis*. In only two of the 6,301 specimens secured from Negroes was the presence of enterobius demonstrated.

17 In the 37,346 specimens from white persons three infestations with *Hymenolepis diminuta* were found. In the 6,301 specimens secured from Negroes four infestations with that parasite were demonstrated.

C. L.

HALPÉRINE (M. O.) Sur la question de la viabilité des oeufs des helminthes dans les composés des matières tourbeuses et fécales. [The Survival of Helminth Eggs in Mixtures of Peat Turf and Faeces].—*Ved. Parasit. & Parasitic Dis.* Moscow 1937 Vol. 6 No. 5 [In Russian pp. 619-625. With 1 chart. French summary p. 628].

When faeces or other dirt is mixed with peaty matter the rise in temperature and loss of oxygen cause destruction of ascaris and trichurus eggs. The temperature is higher in the upper layers so that a stirring of the heap is needed.

C. L.

TAYLOR (E. L.) New Method for the Storage of Nematode Larvae [Correspondence].—*Nature* 1938 Jan. 29 Vol. 141 No. 3561 p. 205.

The method consists in placing on 1 or more 9 cm. wide filter papers (Whatman No. 42) which are already standing on several thicknesses of blotting paper water containing infective larvae from a Baermann apparatus. In 15 to 20 minutes by which time the excess water has soaked away but the papers have not begun to crumple at the edges, such papers are placed face to face in a petri dish of the same size, dish and lid are fastened together by a ring of adhesive plaster and the whole is put away at 36°-40°F. After a year's storage 91 per cent. of such larvae were still alive and active.

C. L.

CERRIATO (Leonardo) Su 4 casi di occlusione intestinale acuta da ascaridi. [Four Instances of Acute Intestinal Obstruction by Ascarids].—*Policlinico Sez. Prat.* 1938 Jan. 31 Vol. 45 No. 5 pp. 186-199-202 [25 refs.].

In all 4 of these children there was a knot of ascarids occluding the lumen of the small intestine, for which laparotomy was done. In one of them there was an added volvulus. Two died of which the child with volvulus was one.

C. L.

KANDELARI (S P) & KAMALOV (N G) The Helminthic Fauna of the Population of Georgia.—*Med Parasit & Parasitic Dis* Moscow 1937 Vol. 6. No 4 [In Russian pp 459-472. With 1 folding map English summary pp 472-473]

Ankylostomiasis is a very serious problem in Western Georgia. Since 1929 some 75 000 persons have had faecal examinations by a method unstated in the English summary. Infections with helminths were detected in 57 to 100 per cent average 91.3. Fifteen species of parasites have been found and as many as 6 species in one person. The estimated number of infected is 300 000 and if Abkhazia and Adjara are included 500 000 clinically ill and 46.3 per cent are seriously ill 44.6 per cent not seriously ill and 46.3 per cent are without discerned symptoms. As to age infection is greatest between 11 and 40 it is greater in men than in women. The submontane regions back from the coast are most heavily infected with hookworms in fact just those places where rainfall is greatest. On unworming 272 persons ganice and coal industries do not suffer. *A. americanus* 92 per cent of the catch *A. duodenale* comprised 8 and *A. americanus* 92 per cent of the catch

LANCET 1938 Feb 5 pp 357-358—Ambiguities in Hookworm Investigations.

C L

Conflicting statements about the efficiency of anthelmintic drugs and the degree of hookworm infection in particular areas are largely the result of lack of precision in diagnosis. This vagueness is no longer justified and would not persist were these matters taken up for settlement with proper care and on a sufficient scale.

There are conflicting statements as to the value of 4 cc of tetrachlor ethylene for expelling hookworms. PESSOA and PASCALE [this *Bulletin* 1938 Vol. 35 p 281] gave two treatments in gelatine capsules to 8 persons found no eggs to Willis's gravity floatation technique after the second, and concluded from counts of worms passed after each that one treatment expelled 85.8 per cent of the worm load. MAPLESTONE and MUKERJI [this *Bulletin* 1938 Vol. 35 p 282] gave the drug shaken up in saturated sodium sulphate solution to 90 persons and using DCF for detection of eggs got a cure per centage of 55 after one treatment and 70 after two. The use of a poor diagnostic technique will give a high and false rate of cure and the use of DCF by the latter workers has the significance that they urge that unworming not egg counts must be the basis for evaluating these drugs and that the most accurate known diagnostic technique must be used. Moreover it was MAPLESTONE who suggested to WILLIS the conception of the technique which commonly goes by the latter's name. Further it is not certain that ancyllostomes and necators were equally distributed in the two series nor that 4 cc of the drug were given in capsules seeing that it evaporates through them, so that the amount of the drug in them as they left the makers is not necessarily that given to patients later. The primary importance of the choice of the diagnostic technique is shown by work of Allen Scott in Egypt. He used on 253 faecal specimens the Stoll Hausheer dilution technique. When the amount of faeces so examined was 0.005 gm. he found 89 positives when it was 0.015 gm. these numbered 109. The floatation technique used as a routine in Egyptian hospitals had shown

OSBURN (H. S.) Strongyloidiasis in Natal.—*South African Med J* 1938. Apr. 23 Vol. 12 No. 8 pp. 292-294

"Five cases of infestation by *Strongyloides stercoralis* are reported.

In two of the cases, both showing diarrhoea and a well-marked degree of anaemia, it is considered probable that the symptoms were entirely caused by the *Strongyloides* infestation."

C. L.

DESPORTES (C.) Complément aux recherches sur la fréquence du trichocéphale et de l'oxyure à Paris. [A Complément to Researches on the Incidence of Trichuris and Enterobius in Paris.]—*Ann. Parasit. Humaine et Comparée* 1938. Jan. 1 Vol. 16 No. 1 pp. 17-21

A re-examination of material from autopsies on persons dying of various complaints in the old Hôpital de la Pitié by BRUMPT in 1909 and preserved since that date.

The material consists of caecum and appendix. For trichuris there were examined 369 caeca with 50.7 per cent. infected the maximum number in one organ being 82 the corresponding figures for the appendix were 369 8.5 and 1. For enterobius the caeca examined were again 369 with 8.4 per cent. infected and a maximum number of 52, the appendices numbered 352 with less than 1 per cent. infected and a maximum of 9 in one organ. BALLAND had examined 399 caeca and appendices for a thesis published in 1910 from the same material and reported 54.7 per cent. infected with trichuris and 12.8 per cent. with enterobius, the present combined figures being 52.4 and 9.06

C. L.

ДИВЯК (J. A.) & ДИВЯК (N. N.) Influence de la température, de l'absence d'oxygène et du dessèchement sur les oeufs de *Trichocephalus trichurus* (L.) [Effect of Temperature, Absence of Oxygen and Drying on Trichuris Eggs.]—*Med. Parasit. & Parasitic Dis. Moscow* 1937 Vol. 6 No. 5 [In Russian pp. 603-617 With 3 figs. [11 refs.] French summary p. 618]

The time taken for development of the trichuris eggs from the single cell stage in fresh faeces to that of a larva is at 15°C. 120 days 20°C. 57 25°C. 29 30°C. 17.5 35°C. 11 days. At 0°C. development stops but life is retained, at 40°C. three-quarters of the eggs die and development is confused. At 30°C. life at all stages is maintained for 6 days in the absence of oxygen with lowering of the temperature this period is increased the two-cell stage is the most vulnerable. Dried eggs survive for long and resistance to drying increases with time the shells apparently becoming less permeable as time passes.

C. L.

WRIGHT (Willard H.) & CRAM (Eloise B.) Studies on Oxyuriasis. IV Some Aspects of the Problem of Therapy.—*Amer. J. Dis. Children* 1937 Dec. Vol. 54 No. 6 pp. 1278-1284

Enterobius infection is often familial, with eggs scattered on clothing furniture and soap in overcrowded families and all members of such must be treated at the same time by some safe and efficient method

No method of therapy at present available meets these requirements, since there is no known anthelmintic which in single doses will remove all the worms from every patient or all the worms from nearly every patient and which is sufficiently safe for use with persons of all age groups. In our investigations tetrachlorethylene came closest to meeting these specifications for single dose treatments. The use of a relatively nontoxic anthelmintic in daily doses over a period of time appears to us to be the most desirable method of therapy, but santonin, which is such an anthelmintic, was not effective in our tests. The fact that oxuriasis is frequently a familial condition complicates the matter of control and necessitates simultaneous treatment of all infested members of the family. The use of enemas medicated or non medicated with or without oral medication, is of value but the prolonged course of treatment necessary in most cases discourages the average person who lacks the persistence to carry out the necessary routine of treatment particularly in large families in which many persons are infested. The use of anal plugs, medicated jellies and anal ointments may be an aid in the control of the disease but as a rule cannot be depended on to eradicate infestations. Our experience indicates that there is still need for a cheap effective anthelmintic which can be administered with safety to persons of all ages and which can be used with a minimum of effort.

The work has been put through in conjunction with medical practitioners

SCHIEFLEY (Charles H) *The Prevalence of Trichinosis.*—*Amer J Hyg* 1938. Jan Vol. 27 No 1 pp 142-148 With 1 fig (15 refs) C L

An analysis of 2,597 examinations made in human autopsies reported by various writers since 1901 makes the percentage of trichinosis infection in the United States 12.3 while various considerations suggest that it is actually about 20.

Examination has been either by pressed muscle or by digestion or by both. Usually it is the diaphragm which is examined by compression as to this THORNBURY reported that in 1,043 swine found positive a quarter were missed in the specimens taken from this muscle only and other workers too have shown how this method fails. As to gastric digestion Schiefley reports that while living larvae survive it dead larvae are converted into a mass of small fragments unrecognized in the debris found on sedimentation. Of the 2,597 cases analyzed the percentage of infection disclosed by digestion was 15.7 and by compression 7.5 and it is calculated (on experience with a series of 35 cases) that the number missed by digestion owing to the death of the measles was such that the actual incidence was about 23 per cent. It is again insisted that this heavy rate of infection was undiagnosed during life and that this shows that many people in the United States eat raw or undercooked pork and that the incidence of the infection in swine in the United States must be high. MAGATI indeed had put it between 2 and 4 per cent. C L.

VAN SOMEREN (Vernon D) *The Excystment of Trichinella Larvae in Artificial Gastric Juice.*—*J Helminthology* 1937 Dec. Vol 15 No 4 pp 177-182. With 4 figs.

The excystment of these larvae in artificial gastric juice was watched taking place from voluntary muscles of a polar bear which died in the London Zoological Gardens. (1299)



The cysts were unusual oval with fat aggregated at the poles. "The walls of the cysts are partially calcified round one pole only the other pole showing only slight calcification" each cyst is filled with a clear viscous fluid, while immediately adjacent to the larva is a granular jelly-like mass. Cysts dissected free were placed in one of three solutions (1) artificial gastric juice (1 per cent. granular pepsin and 0.5 per cent. hydrochloric acid) (2) 0.5 per cent. hydrochloric acid, (3) normal saline and were kept at 37°C. In solution 1 the calcium had dissolved in 5 minutes, as it also had in solution 2. In about 15 minutes in gastric juice digestion of the cyst wall allows escape of the jelly and with that escape the larvae begin to be active and become increasingly so. The larval tail escapes through a hole made by digestion of the cyst wall and it pulls itself out the jelly which has escaped is digested and the cyst wall collapses the process being complete in about 35 minutes. The impression left was that the larva's part in gaining release was not by any secretion of its own but by its active movements in utilizing digested holes in the cyst wall. The question is raised whether general calcification of the cyst wall seen in older measles, would prevent excystation seeing that the local digestion of the wall in the cysts watched took place where calcium deposit was least and the wall thinnest namely near the embryo.

C. L.

## DEFICIENCY DISEASES

GERMAIN (A) MORVAN (A) & BABIN (R.) *Bériber déséquilibre alimentaire et fermentations intestinales* [Alimentary Dis-equilibrium and Intestinal Fermentation as a Cause of Beriberi].—*Bull Soc Path Evol* 1933 Feb 9 Vol. 31 No 2 pp 147-154 Summary appears also in *Bulletin of Hygiene*

It is stated that beriberi results not only from a lack of vitamin B<sub>1</sub> in the diet but also at times from an increased intake of carbohydrates and from an excess production in the intestine of acids of fermentation especially lactic acid. A case is described in detail of a patient receiving a very high carbohydrate diet which contained what would ordinarily have been an adequate amount of vitamin B<sub>1</sub>. The man took alcohol only to a moderate degree. He developed polyneuritis oedema and tachycardia. A diagnosis of beriberi was made. The intake of carbohydrates was drastically reduced and bismuth subnitrate and kaolin were given to absorb intestinal acids. No extra vitamin B<sub>1</sub> was given. The pathological symptoms of beriberi disappeared.

Douglas C Harrison

PRICE \* (Norman L.) "Alcoholic Beriberi.—*Lancet* 1938 Apr 9 pp 831-834 With 2 figs [19 refs]  
LANCET 1938 Apr 9 pp 831-852. "Alcoholic Beriberi.—*Lancet* 1938 [Summary appears also in *Bulletin of Hygiene*]

A case is described of alcoholic beriberi the symptoms of which were breathlessness loss of appetite and weight abdominal pains leg swelling muscle tenderness rapid heart beat (120) etc. This case was diagnosed as acute heart failure. The dietary history was bad—irregular meals mainly white bread and butter and tea and 3 to 5 pints of beer a day. Large amounts of marmite and Bemax were given by mouth and later intramuscular injections of Betaxan equivalent to 4 mgm. crystalline B<sub>1</sub> daily. After 3 months treatment there was a gain of 30 pounds in weight and the patient was free from any sign of cardiac or nervous disease. The assumption that B<sub>1</sub> deficiency is the root cause of all forms of secondary beriberi is discussed. The intake of B<sub>1</sub> is nearly always low in these cases especially in chronic alcoholism where loss of appetite causes the proportion of alcohol to ordinary solid food taken to become even greater the anorexia in all probability being due partly to B<sub>1</sub> deficiency. Evidence tends to show defective absorption in these secondary cases of beriberi achlorhydria nearly always being present and much greater curative effect being obtained by injection of B<sub>1</sub> than by oral administration. There is almost certain to be an increased need of B<sub>1</sub> on a high alcohol diet as the requirement of B<sub>1</sub> depends on the type of food eaten a high protein and fat diet requiring less B<sub>1</sub> a high carbohydrate diet using up more B<sub>1</sub> for carbohydrate combustion. Alcohol can replace carbohydrate almost completely as a fuel and therefore probably demands a greater supply of B<sub>1</sub> although alcoholic beverages are themselves practically devoid of it. All these considerations point to the conclusion that alcoholic beriberi is a true B<sub>1</sub> deficiency disease. The editorial comment recalls that for some years alcoholic neuritis has been cured by B<sub>1</sub>. It is suggested by some workers that

the nervous complications of nutritional anaemia have been advantageously treated by B<sub>1</sub> as well as liver extract. The administration of thyroid increases the B<sub>1</sub> requirement. *Douglas C Harrison.*

HAWES (R. Brunel) *The Treatment of Acute Fulminating Cardiac Beriberi (Shōshin)*—*Trans Roy Soc Trop Med & Hyg* 1938. Mar 17 Vol 31 No 5 pp 474-482

The symptoms of the dying case of beriberi are described. The author then relates his experience with these cases when pure vitamin B<sub>1</sub> is administered and cites a number of typical cases. When sufficient vitamin is given, the result is startling—a dying man was injected in the morning and walked the length of the ward in the afternoon. Huge doses are required, 2000 I U being given in some cases in one injection. If the dose is too small, a short temporary improvement results, followed by collapse. The author sums up the results of his investigations—the vitamin is non-toxic and the effect of one dose is lasting. If this is given by injection and in sufficient quantity the effect is very rapid. *Douglas C Harrison*

LONDON (J V) & WILLIAMS (C. D.) *A Note on Epidemic Dropsy*—*Brit Med J* 1938. Jan 15 p 119

Brief notes are given of three cases of epidemic dropsy all Bengalees a man his wife and his sister. The clinical conditions were typical. All three lived in the same house and had meals together and mustard oil was in daily use. Another member of the family had lived with them, but not feeling in the best of health and thinking that the food was not all that could be desired he left and went to live elsewhere. Examination of a sample of the oil yielded no positive evidence but it may not have come from the same supply as that which had been used. Though evidence has been accumulating that mustard oil is responsible, in part if not entirely for producing epidemic dropsy as LAL and ROY have shown it is probable that only certain of the commercial products are toxic for more use it for cooking without presenting symptoms than the reverse. In these cases unfortunately there is little evidence to support the thesis in fact except that oil was used, there is no evidence of its being causative. *H H S*

PARRICHA (C L) LAL (S) & MALIK (K S) *The Specific Gravity of Serum of Epidemic Dropsy Patients*—*Indian Med Gaz* 1938. May Vol 73 No. 5 pp 283-284

Eight years ago MOORE and VAN SLYKE showed that with a fall of plasma albumen below 2.5 per cent or of total plasma protein below 5.5 per cent when the serum has a specific gravity between 1.0227 and 1.0233 oedema occurs. Serum of six healthy subjects had a specific gravity ranging between 1.0256 and 1.0275 with a mean of 1.0263. In twelve patients suffering from epidemic dropsy the range was from 1.0140 to 1.0235. The patient with the low figure died ten days later the mean of the others was 1.0223. When recovery had taken place at all events when oedema was no longer present the specific gravity of the serum had returned nearly to normal, the limits being 1.0246 and 1.0270 with a mean of 1.0259.

*H H S*

SMITH (Charles Edward) & STEVENS (Ida May) An Analysis of 520 Cases of Pellagra reported in California from 1928 to 1935.—*Amer J Hyg* 1938. May Vol. 27 No 3 pp 590-614 With 5 figs. 24 refs

This analysis of cases of pellagra comes from the Department of Public Health and Preventive Medicine Stanford University School of Medicine and the Bureau of Epidemiology California State Department of Public Health

Nine hundred and forty two cases of pellagra were reported in the period 1920-1935 case-histories were requested in the 627 cases for the years 1928-1935 520 case histories received were studied They were all sporadic There was a history of alcoholism in 42 per cent of dietetic deficiency without alcoholism in 22 per cent of some preceding illness in 13 per cent Among the alcoholic cases males predominated in the proportion 62 to 35 in the non alcoholic cases the reverse was found Previous attack was only noted in 8.7 per cent of alcoholic and 16.4 per cent of dietetic deficient cases Half the cases occurred in the 40-59 years age group Seventy per cent. showed a February July seasonal incidence 50 per cent being in months February May with a peak in March as compared with peak in May in Baltimore and June in S Carolina. Two-thirds of the patients died 92 per cent. of 146 pellagrins exhibiting dementia diarrhoea and mouth lesions as well as dermatitis died Cases were predominantly urban. No institutional cases noted.

H S STANNUS

LANCET 1938 Jan. 29 pp 282-283 [19 refs.]—Aetiology of Pellagra and the Nutritive Value of Maize.

A leading article tracing the history of the attempt to solve the problem of the relationship of pellagra with a dietary deficiency doubtless well-known to all those interested in the subject. Being in the nature of a review it is impossible to summarize. As regards the second part of the title the relationship of maize eating to pellagra still remains unsolved, all that can be said is that it "may be due to a deficiency of nicotinic acid in maize. [Allusion is made to the misleading indications afforded by rat feeding experiments facts which should never be forgotten as so often the problem has seemed so simple whereas it is often very complicated.] A short reference is made to so-called secondary pellagra and the statement is made One may assume that in these cases the disease is caused by defective absorption of the essential dietary factor from diets in which it is not abundant [This is an assumption it is a common assumption but without proof.]

H S S

LIQUORI (Paul) On the Etiology of Pellagra.—*Proc Karo El Asy Clin. Soc* Cairo. 1937 July Vol. 5 No 2. pp 1-11 [18 refs.]

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GHALIOUNGUI (Paul) On the Etiology of Pellagra.—*Proc Kasr El Ainy Clin Soc* Cairo 1937 July Vol. 5 No 2 pp 1-11 [18 refs.]

Some general remarks concerning pellagra with no new facts.

H S S

DAMM (W J) Animal Deficiency Diseases related to Pellagra.—*Jl Amer Dietetic Assoc* 1938 Mar Vol 14 No 3 pp 157-167 [43 refs] [Summary appears also in *Bulletin of Hygiene*]

A history of the unravelling of the vitamin B complex is given the only part suitable for summary being the statement of the present position regarding vitamins B<sub>1</sub> and B<sub>2</sub>

B<sub>1</sub> is the antineuritic factor [Its constitution is known and it can be synthesized]

B<sub>2</sub> consists of

- (a) Lactoflavin, essential for growth in rats and chicks prevents dermatitis in turkey poult, cataract in rats and yellow liver in dogs [Constitution known and can be synthesized.]
- (b) Nicotinic acid, cures human pellagra and black tongue in dogs. [Constitution known and can be synthesized]
- (c) The rat pellagra-preventing factor
- (d) The chick-pellagra-preventing factor also essential for rat growth

Douglas C Harrison.

SCOTT (W M) Pellagra Secondary to Lesions of the Gastrointestinal Tract.—*New Orleans Med & Surg Jl* 1938 Jan. Vol 90 No 7 pp 403-409

Clinical reports upon a series of fourteen cases of pellagra associated with gastro-intestinal lesions, eleven of which proved fatal. Of the fourteen cases seven were suffering from lymphopathia venerea infection of the rectum (L I) two with carcinoma of the stomach two had malignant diseases with metastases and there were one each stricture of the oesophagus rectal polyp recto-vaginal fistula and amoebiasis

[These cases resemble closely those previously reported by various authors collected together in this *Bulletin* 1937 Vol 34 pp. 183-204]

H S S

KATAM (Alexander) A Case of Pellagra.—*London County Council Ann Rep* 1936 Vol 4 Part 3 (Med Supp) pp. 148-149 With 2 figs

Report of the case of a 55-year-old woman who died in St Alfege's Hospital with symmetrical skin lesions, stomatitis and diarrhoea. Upon these signs the diagnosis of pellagra was made there was besides "the typical aspect of Parkinsonism"

[These cases of what might be called terminal pellagra are probably commoner than is generally thought]

H S S

FAIRLEY (Keith D) Pellagra.—*Roy Melbourne Hosp Clin Reports* 1937 Dec Vol 8 No 2 pp 121-124 With 2 figs on 1 plate.

A case of pellagra in the person of a 25-year-old unmarried woman under care in the Royal Melbourne Hospital, in which extensive dermatitis was associated with gross wasting, gastro-intestinal disorder nervous and mental changes and oedema of the lower limbs.

The patient had given up work three years before on account of increasing weakness and constant headache, she had become mentally dull and delusional, vision and hearing had become impaired and

numbness in the feet was complained of. Just over 5 feet 1 inch in height she weighed only 3 stone 7½ pounds. blood pressure 120/80. Blood count showed—red cells 2 600 000 leucocytes 6 000 per cmm. haemoglobin 49 per cent. urine normal. Free hydrochloric acid up to a maximum of 35 c of decinormal caustic soda per 100 cc of gastric contents was present in a test meal.

Other investigations showed low blood chlorides and low serum proteins. the serum calcium was however greatly increased and associated with some deralcification of the skeleton. Blood sugar curve low. Amount of ascorbic acid excreted in the urine in twenty four hours 9 mgm.

The diet was considered to have been grossly deficient. On a high protein diet with a large vitamin content improvement was rapid.

The author suggests some possible pituitary defect with perhaps some secondary hyperparathyroidism and refers to the association of pellagra with endocrine dysfunction commented on by various observers. He also refers to pellagra as almost exclusively a disease of maize-eaters.

[The greatest caution would seem necessary in interpreting the possible association of endocrine syndromes with pellagra cause and result may otherwise be mistaken. It is also essential to get rid of the widespread belief in the maize origin of pellagra otherwise cases of pellagra occurring sporadically will be missed.]

BECKH (W) ELLINGER (P) & SPIES (T D) *Porphyria in Pellagra*.  
—*Quarterly J. Med.* 1937 Vol. 6 (New Ser) No 23  
pp 305-319 [49 refs] H S S

The author's summary and conclusions are as follows —

1 The urinary output of porphyrin was studied in 14 cases of alcoholic pellagra, two cases of pellagra secondary to infectious disease of the gastrointestinal tract and three cases of healed pellagra also as controls in 18 healthy persons 49 persons suffering from various diseases other than pellagra, two monkeys with mild nutritional macrocytic anaemia, and five normal subjects receiving yeast and the same number receiving liver extract. Except for one case of secondary pellagra and some of the control cases all cases were observed at Lakeside Hospital, Cleveland, U.S.A. Urine specimens were obtained at representative stages of the disease. No extremely mild attacks of pellagra are included in our series.

2. While the cases of endemic pellagra observed by Ellinger and Dojmi in Yugoslavia had, without exception, in the beginning of the disease a high porphyrin output usually disappearing early in remission but always when cured, the porphyrin output of the alcoholic cases in this study showed a greater variation. In most of the latter cases the porphyrin excretion bore a rough relationship to the intensity of the skin lesions and the mucous membrane lesions as the patients were watched in their progress toward recovery. On the other hand among the patients showing no porphyria there were mild skin lesions in three cases and none in one case. The greater variability of porphyria in the alcoholic pellagrins may be in relation to the history of alcoholism.

3 Of 67 control subjects (healthy persons and those suffering from various diseases other than pellagra) only five showed an increased porphyrinuria, three of whom were receiving iron therapy.

4 The porphyrin present in the cases of pellagra was found to be a coproporphyrin.

5 A similarity is pointed out between the clinical symptoms of acute porphyria and pellagra. One case of pellagra is described which exhibited all signs of an acute porphyria.



"6 A new colorimetric method is described for the quantitative estimation of ether-soluble porphyrins in small amounts of urine.

7 The origin of the porphyrins as well as their possible agency in the genesis of the skin lesions of pellagra is discussed. No further light was thrown on the relation between dermatitis and exposure to sunlight.

8 The necessity for a further study of a large series of cases of pellagra of different origin is evident.

The paper should be read by all interested in porphyrinuria.

H S S

SPIES (Tom Douglas) SASAKI (Yasuo) & CROSS (Esther) A Note on the Relationship of Porphyrinuria to Human Pellagra.—*Southern Med J* 1938 May Vol 31 No. 5 pp 483-486 [10 refs]

The article opens with a short review of the porphyrins. All consist of a system of four pyrrol nuclei united by four methylene groups. Porphyrin enters into the composition of haemoglobin and myoglobin as protoporphyrin type III united to iron and protein. Porphyrin metabolism concludes with the excretion of coproporphyrin.

Twenty cases exhibiting pellagrous glossitis and dermatitis except in six were maintained on a pellagra-producing basic diet. Porphyrin was excreted in large amount in all cases, to disappear from the urine when supplements of yeast liver extract or nicotinic acid were given. Four patients received no supplement—in them the porphyrinuria slowly disappeared in the course of 4 to 6 weeks. The urine of 2 classical cases of pellagra yielded coproporphyrin I and III.

It had also been noted that nicotinic acid relieved the symptoms in a case of congenital porphyrin.

The authors conclude that increased porphyrinuria is an integral part of the pellagra syndrome the degree does not however parallel the severity of the pellagrous manifestations. Nicotinic acid reduces this porphyrinuria. They suggest that a lack of nicotinic acid may be a factor in the development of pellagra and an impairment of liver function, with the result that coproporphyrin III is formed in large quantities. Coproporphyrin I and III may account for photosensitization observed in some pellagrins.

H S S

CASTELLANOS (Augustín) El síndrome pelagroide-beri-berico [The Pellagroid Beriberi Syndrome].—*Vida Nueva* 1937 Oct 15 Vol. 40 No. 4 pp 199-218 With 5 figs.

This condition described as it occurs in Cuba is said by the author to be the same as the Mexican *culebrilla* (ringworm disease) and the *krashorkor* as described by Dr C WILLIAMS in the Gold Coast [see this Bulletin 1936 Vol 33, pp 410-734 *Bull. of Hyg.* 1936, Vol. 11 p 311]. Any differences noted are merely differences of degree thus the oedema is less marked in the African cases and the psychic disturbances less in Mexico. It seems to be a manifestation of vitamin deficiency, notably of vitamin B factors and the minor or graded differences are ascribed to the fact that the diets in Mexico in Africa and in Cuba are all deficient in vitamin B but not all equally deficient in the same factors. There are many resemblances to pellagra and particularly to experimental pellagroid and all transitions are seen between abortive cases and those with extensive erythema and generalized oedema.



Typical case of pellagroid beriberi syndrome  
[Reproduced from *Vida Nova*]

The only successful treatment comprises a diet of milk and vitamin B<sub>1</sub> and B<sub>2</sub> in quantity, aided in severe cases by whole blood transfusion. In those from 1½ to 2 years of age green vegetables and fresh fruit are needed also.

H H S

SEBRELL (W. H.) *Vitamins in Relation to the Prevention and Treatment of Pellagra.*—*Jl Amer Med Assoc* 1938 May 14 Vol. 110 No. 20 pp. 1665-1672 [91 refs.] [Summary appears also in *Bulletin of Hygiene*]

The four separate factors now known to exist in the vitamin B<sub>2</sub> complex are discussed—(1) lactoflavin or riboflavin (2) nicotinic acid which is the human pellagra preventing factor and also prevents black tongue in dogs (3) the chick pellagra preventing factor and (4) the rat anti-dermatitis factor. The various aspects of treatment of pellagra are then discussed. Sunlight acts as an irritant in pellagra and pellagrins should not be exposed to sunlight but this is a point of relatively minor importance and recovery cannot be made without

## REVIEWS AND NOTICES.

GILL (Clifford Allchin) [Colonel, I.M.S. (retd.) M.R.C.P. (London) M.R.C.S. (Eng.) D.P.H. D.T.M. & H. (Eng.) etc.]. *The Seasonal Periodicity of Malaria and the Mechanism of the Epidemic Wave* — pp. vi + 136. With 1 map and 17 figs. 1938. London. J. & A. Churchill, Ltd. 104 Gloucester Place, Portman Square. [10s. 6d.]

This is a small monograph giving the results of a study by the author of seasonal effects in malaria and the mechanism involved in the severer types of epidemics of this disease. The author commences by distinguishing a number of epidemiological types of malaria associated with distinctive climatological features. He has been unable to do this on the basis of climatic zones or provinces recognized by climatologists but by a classification based upon mean monthly temperature and humidity the following four epidemiological types of malaria can be correlated with the respective climatic zones, viz. (1) temperate zone malaria (2) subtropical zone malaria (3) tropical zone malaria and (4) equatorial zone malaria. The distinctive features of these types are clearly described and their distribution is indicated on p. 14 by a map of the world on Mercator's projection. Temperate zone malaria is characterized by an absence of malignant tertian infections. Its limits are given by a mean temperature during the hottest months of between  $16^{\circ}$  and  $20^{\circ}$  C. and a mean monthly relative humidity which never falls below 70 per cent. It is seen in its most typical form in Holland, where it has been closely studied. Epidemiologically, it is distinguished by a spring epidemic, which it has been known for some time is the result of infection contracted in the previous autumn, the clinical effects not being developed at once (i.e. in the autumn) but lying over as a latent or dormant malaria until the following spring. Subtropical zone malaria is typically represented in the Mediterranean area. Its limits are defined as those between  $20^{\circ}$  and  $25^{\circ}$  C. during the hottest months and a relative humidity which never falls below 50 per cent during any month of the year. It has been intensively studied in South Italy and is characterized by two epidemic rises in the year one in the spring and one the more important in the autumn. The attacks of malaria in the spring are as in temperate zone malaria largely due to infection contracted in the autumn, but in this case they are mostly relapses not delayed primary infections since they occur mainly in those who have already had an attack of malaria in the previous autumn. Tropical zone malaria owing to low temperature during the winter and extremely high temperature and low humidity during the spring and early summer is chiefly displayed as an autumnal increase. The zone is defined as that in which the mean temperature during the hottest months exceeds  $25^{\circ}$  C. and the mean monthly relative humidity is less than 50 per cent during one or more months of the year. This is the form of malaria seen and studied in the Punjab in the north of India and in connexion with which the great epidemics of northern India occur. The fourth epidemiological type or equatorial zone malaria is characterized by both spring and autumn epidemics which are of equal magnitude. The mean monthly temperature does not fall below  $25^{\circ}$  C. and relative humidity is high (never less than 70 per cent.)

corresponding to the copious and well-distributed rainfall. Whilst in the tropical zone rainfall is the chief factor determining the degree of epidemic prevalence in the equatorial zone the determining factor is drought. An example of an epidemic associated with this type and one for which there is much information available is the recent epidemic in Ceylon. These different types of malaria are closely studied from the point of view of the essential elements in the make up of the respective epidemic rises that of the European types being particularly interesting owing to the very complete nature of the information which especially as a result of recent work in Holland is available. Among data more especially utilized by the author for this purpose are the morbidity statistics for the village of Wormerveer (pop 3 000) during the years 1902-1923 as compiled by Kortweg (Swellengrebel 1924). During this period of 24 years 2,803 cases of malaria (diagnosed microscopically) came under observation of which 390 were second relapses in the same year. Kortweg differentiated the relapses in persons whose primary attack occurred in the previous year from other relapses and he also recorded the monthly figures in respect of all these occurrences. By means of such data a complete analysis of the mean monthly malaria morbidity can be arrived at and the extent of the obscured primary infections in the autumn made apparent. An analysis on similar lines of other morbidity statistics from Holland and of those relating to the Moscow Province in Russia in 1922 and 1923 (the years of the great Russian epidemic) given by Dobritzner very clearly demonstrates the extent of the hidden autumnal component (which may sometimes even be manifest as a definite autumnal crest in the wave) to the subsequent year's spring epidemic. Subtropical malaria has been extensively studied in South Italy. It is complicated as compared with temperate zone malaria by the occurrence in addition in the autumn of malignant tertian. The same applies to tropical zone malaria where malignant tertian is mainly responsible for the morbidity and mortality of the characteristic epidemic manifestations. It is here that the author encounters the outstanding puzzle of all the facts with which he has to deal, viz what is the mechanism which enables malignant tertian to increase so rapidly at the commencement of its epidemic prevalence seeing that all authors are more or less agreed that this parasite does not give rise to the long relapse characteristic of benign tertian and that whenever observations have been made preceding or at the onset of the epidemic the number of gametocyte carriers has been found to be almost negligible. In the present volume the author puts forward certain evidence in support of his belief that the seasonal epidemic wave alike with malignant as with benign tertian is initiated by a seasonal wave of relapses. Those who are not inclined to agree that the arguments prove such an hypothesis would say that the possibilities of rapid geometric increase of infection arising from an initial very small gametocyte content in the community have been insufficiently explored. In which direction the truth lies only more complete data can finally decide. The book gives a very clear exposition such as is not elsewhere to be found in the literature of what is known of malaria epidemiology using this term in perhaps its most correct denotation as indicating the reasons for the seasonal and epidemic variations in malaria prevalence and the major climatological aspects under which such variations occur. There is an excellent index and a very concise and useful appendix (Appendix I) giving the mean monthly temperature and

mean monthly relative humidity of selected localities in the different malaria zones as described and defined by the author

*S R Christophers*

CONYELL (W K) [M.B. Ch.B. (Glas.) F.R.C.S. (Eng.) D.T.M. & H. (Lond.) Surgical Specialist Tanganyika Territory]. *Surgical Handbook for Hospital Assistants in the Tropics.*—pp. xv + 440. With 177 figs. 1933. London. John Bale Medical Publications. 85 Great Titchfield Street W.1. [12s. 6d.]

In reviewing this book we find no necessity to stint praise. The publisher's work leaves nothing to be desired—good paper, clear type and lavish illustrations of proven worth heap up a measure which the coloured plates truly cause to brim over.

The Sections are well arranged and cover inflammation, surgical infections, V.D., bones and joints, inflammations of the different organs, neoplasms and cysts, shock and haemorrhage, anti and aseptic wounds, burns, fractures, brain injuries, uræmia and coma, dislocations, obstruction, the acute abdomen, hernia, scrotal swellings and their diagnosis, congenital deformities, acute retention and hæmaturia, general and local anaesthesia, methods of examining and recording condition of patients.

The information is conveyed in plain language, is concise and leaves the reader in no doubt as to the author's advice which, thanks to an adequate index, is readily obtained.

The scope of the book is covered by the title and dedication to "That brave and loyal-hearted gentleman the East African Native."

The knowledge conveyed is of a high standard, being that to which a first-class Assistant should aspire and no medical man overlook. Minor operations and surgical procedures are fully detailed and their limitations defined, no help whatsoever being offered on major surgery or matters rightly relegated to the purview of the medical officer. Standard treatments and tests are explained while throughout the book both principles and practice are thoroughly up to date.

Most impressive is the sound conservatism advocated. The days when fearless incisions were made at the slightest sign of inflammation are gone and the author sees to it that they are well buried. It is refreshing to read. The best dressing for any suppurating focus is in fact its own purulent discharge, the removal of which through a misguided zeal for cleanliness is much to be deprecated.

Briefly then, this book is whole-heartedly recommended to Assistants, Missionaries, Nurses, and even to medical practitioners of whom there will be few who cannot glean fresh ideas from its pages.

*A. L. Gregg*

## BUREAU OF HYGIENE AND TROPICAL DISEASES

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## TRYPANOSOMIASIS

MACQUEEN (M D) Report of the Sleeping Sickness Service, 1936 —  
*Nigeria Ann Rep on Med Services 1936 Appendix B pp 93-100*

Work has been continued both in the field and at Gatau on the same lines as in 1935 except that owing to temporary shortage of medical staff only five instead of the usual six teams could be kept continuously in the field. The total number of cases diagnosed and treated by the Sleeping Sickness Service since 1931 is 240,900. During the same period 24 033 patients have been treated at general medical stations.

It has become increasingly evident that treatment by itself cannot control the disease in Nigeria. Protective measures such as communal clearing and the movement and concentration of population can be the only radical cure. A grant of £30,000 per annum was asked for to finance sleeping sickness control. Of this approximately £11 000 was required for the expansion and improvement of the existing treatment service and £19 000 for the part of the scheme involving communal clearing and the movement and concentration of population. The Colonial Development Fund have recommended a grant on a five years basis to pay for the latter part of the scheme on condition that the Nigerian Government finds the balance required for the improvement of the treatment service. The prospects for the control of the disease in the Northern Provinces are now very much brighter.

The author then passes on to discuss the various items of research which have been done during the past year. The first item relates to the testing of experimental drugs. Regarding neocryl the author writes as follows —

Some sixty cases have now been treated with the British compound Neocryl (S 107). This drug produces rapid clinical improvement and seems to be quite as effective as trypanamide. In practically all cases both the blood and gland juice are cleared of trypanosomes by the time of the second routine examination which is always carried out after the third injection of the drug has been given. The diminution in the cell count of the cerebrospinal fluid is not always very rapid, but most patients show considerable clinical improvement after two or three injections and declare themselves to be cured by the end of the course. Neocryl is given in 3 gramme doses at five-day intervals. This is a higher dosage than can safely be given to local patients with trypanamide the usual dose of which is 2 grammes at five-day intervals.

"In some instances the injections have been followed by headache and pyrexia, but this is not usual. One of the Jos cases, a man showing considerable signs of mental aberration, complained of diminished vision after having received 16.5 grammes of the drug. He was then put on to Bayer 206 but a fortnight later was completely blind and died within a month in the last stages of cerebral trypanosomiasis. Another Jos case complained of dimness of vision after a fortnight, but this cleared up completely when the arsenical compound was discontinued and he was given Bayer 205."

Experiments were continued on the effect of exposing premunized animals to fresh infections. Twenty-one cattle which had recovered either naturally or after treatment from *T. vivax* infections, were inoculated with *T. vivax*. It was found that these cattle were but little affected by this inoculation (one death in 12 months) which sufficed to kill 8 of 10 healthy controls. In order to ascertain whether this resistance to *T. vivax* was due to the presence of specific antibodies acquired by the animals during their previous infections, or whether it was a resistance inherent in the animals and not acquired artificially 17 of the above mentioned premunized animals were injected with *T. congolense*. After 10 months it was found that although 8 of the 10 control animals had died there was only one death among the 17 premunized animals and that the remainder appeared reasonably healthy and had put on weight. From this it is concluded that these cattle possessed a natural rather than an acquired resistance to trypanosomal infection.

Experiments are being undertaken with a view to ascertaining whether ineffective treatment of cases of sleeping sickness with trypanamide will enhance the resistance of the strains to that drug. The work is not yet complete.

Work is also being continued on the relationship of *T. gambiense* and *T. rhodesiense*. Evidence has been obtained that in some localities the disease has become more virulent than it was 6 or 7 years ago. Such changes of virulence have occurred in areas where there is no *G. morsitans* and very little game.

The report concludes with a summary of the investigations of Mr NASH the Entomologist and of the field work done by the various sleeping sickness teams. It is noted that during 1936 417 495 people were examined by the sleeping sickness teams and 47,550 were found to be infected. Of these 40,897 had completed treatment by the end of the year. A further 10 450 cases were diagnosed and treated at field dispensaries and 4,021 at general medical stations.

W. Yorks

VAN HOOFF (L.) HENRIARD (C.) & PHIL (E.) Contribution à l'épidémiologie de la maladie du sommeil au Congo Belge. [Contribution to the Epidemiology of Sleeping Sickness in the Belgian Congo].—Ann Soc Belge de Méd Trop. 1938. Mar 31. Vol. 18. No. 1. pp. 143-201. With 1 folding map. [15 refs.]

Thanks to the collaboration of a number of doctors in the Belgian Congo the authors have been able to add to their collection a number of strains of *T. gambiense* collected from the majority of the endemic areas in the Colony. The strains have been examined in respect of their resistance to trypanamide and their transmissibility by *G. palpalis*. Observations have also been made on their pathogenicity

their morphology in guinea-pigs and their reaction to therapeutic agents

As in the previous papers the index of cyclical transmissibility is calculated by the following formula —

$$I = \frac{g}{i} \times \frac{n \times 100}{N}$$

where  $I$  = index of cyclical transmissibility

$g$  = number of Glossina with trypanosomes in the salivary glands after the 15th day of the experiment

$i$  = number of Glossina which were found to harbour trypanosomes.

$n$  = total number of infected Glossina found during the whole experiment

$N$  = number of Glossina dissected during the experiment

The mean index of transmissibility for the Congo is 3.63 the index of infectivity is 6.17 per cent and the metacyclic index is 0.61 per cent. The index varied from zero (strains non transmissible) to 10.2. About 5 per cent. of patients were infected with non transmissible strains.

Seasonal variations did not appear to be a cause of these differences in the transmissibility index nor did the resistance to trypanamide explain the phenomenon. In chronic cases and in patients treated for a long time and refractory to treatment either because of a deep extension of the infection or because the parasite had become arsenic resistant and especially in those who suffered from blood relapses after an adequate treatment the index of transmissibility is notably lowered. Two factors seem to intervene in this biological modification of the trypanosome: its length of sojourn in one particular host and the drug impregnation. The index of transmissibility varied in the different endemic zones.

The pathogenicity of *T. gambiense* for laboratory animals its arsenic-resistance and its morphology suggested in certain cases the existence in the Belgian Congo of *T. rhodesiensis* but this hypothesis can only be accepted with reserve.

Natural resistance on the part of *T. gambiense* to trypanamide is much more common than was believed. Examples were found in all the endemic zones of the Belgian Congo. It was found possible to make *T. gambiense* resistant to trypanamide in the guinea-pig and such resistant strains were cyclically transmitted by *G. palpalis*.

The origin of these naturally resistant strains is the subject of discussion. That it results from inadequate treatment cannot be the only explanation of the large number of resistant strains observed. Another source of the resistant strains is found in the parasites which are well tolerated by the wild and domestic animals. Glossina necessarily renew their supply of cyclically transmissible trypanosomes from these animals. A trypanosome can acquire suddenly and without obvious reason, a certain degree of arsenic-resistance by passage through unaccustomed hosts.

The therapeutic warfare against human trypanosomiasis can be regarded as the best method in the Belgian Congo. In addition to sterilizing the reservoir of the virus it decreases its capacity to develop in Glossina.



GABRA. La maladie du sommeil dans le district du Kwango avant l'occupation de ce district par Foréami jusqu'à fin 1934. [Sleeping Sickness in the Kwango District before its Occupation by Foréami at the end of 1934.]—31 pp. 1938. Bruxelles. Foréami.

This article which is a review of the history of sleeping sickness in the Kwango District from the time of its first discovery in 1910 up to 1934 is of local interest only and must be consulted in the original. It describes the development of the disease in Kwango and the methods adopted to combat it. The results obtained have been only mediocre, and new measures are required. The author states briefly what measures in his opinion, should be adopted. H 1

TARANINO (Giovanni Battista). La tripanosomiasi nel Galla e Sidama. [Trypanosomiasis in Galla and Sidama (Abyssinia).]—*Riv di Biol Colon*. Rome. 1938. June. Vol. 1 No. 3 pp. 161-164. English summary (8 lines)

The author has found along the tributaries of the Acobo and the Kibish which separates Mongalla from Abyssinia, considerable numbers of *Glossina*, both *pallipes* and *moritani*. Actual figures are not given, but it is stated that females were markedly predominating. Trypanosomiasis of animals *T. brucei* and, less prevalent *T. congolensis* is found. In Galegiba the tsetse is known as *Bur* bovine trypanosomiasis as *Tarso* around the Kibish and the tributaries of the Acobo the disease goes by the name *Duiki*. Parts chiefly infested are the rivers Derebusha and the borders of the Kibish and caravans travel through the district by night preferring the risk of horse-sickness to that of trypanosomiasis.

Though no human case of sleeping sickness has yet been observed in Galla or Sidama, the presence of *G. pallipes* and *G. moritani* there, and the proximity of Uganda and the Sudan, clearly indicate a possibility of invasion. H H S

SCHWETZ (J). Quelques réflexions et suggestions pour une future classification des trypanosomes pathogènes de l'Afrique Centrale. [Some Reflections and Suggestions for a Future Classification of the Pathogenic Trypanosomes of Central Africa.]—*Ann. Parasit. Humains et Comparés*. 1938. May 1. Vol. 16 No. 3 pp. 265-272. [10 refs.]

As a result of his cogitations Schwetz reaches the conclusion that the African trypanosomes can be divided morphologically into three groups —

- 1 *Congolensis* group monomorphic with lateral blepharoplast.
- 2 *Itax* group monomorphic with terminal or subterminal blepharoplast.
- 3 *Brucei* group polymorphic with subterminal or lateral blepharoplast.

Each of the groups is then elaborated in the following manner —

- 1 *Brucei* group. Type *T. brucei*. Biological varieties *T. fexensis* transmitted by *G. pallipes* instead of *G. moritani*, and *T. rhodesiensis* transmissible to man. Special biological species *T. gambiense* the trypanosome of sleeping sickness.

Morphologically these trypanosomes cannot be distinguished from one another. In all of them are found individuals with a free flagellum and others without a free flagellum. The blepharoplast is sub-terminal or more rarely lateral.

2. *Vivax* group. Blepharoplast is always terminal and the flagellum free. Type *T. cazalboui* (*T. congolense* *T. caprae*). Posterior extremity rounded. blepharoplast terminal with a long free flagellum.

Variety *T. uniforme* smaller than the preceding and *T. vivax sensu stricto* longer than *T. cazalboui* with the posterior extremity somewhat affilated and with a very long free flagellum.

3. *Congolense* group. Blepharoplast always lateral without a free flagellum or sometimes with a free flagellum. Type *T. congolense* short no free flagellum. Synonyms *T. pecorum* *T. nanum*.

Varieties *T. dimorphon* (Laveran) longer and thinner *T. montgomeryi* very thick.

Special species *T. suis* longer with and without a free flagellum. Synonyms *T. simias* (*T. ignotum*) *T. rodhaini* *T. porci* W 1

HOARE (C. A.) & BROOM (J. C.) Morphological and Taxonomic Studies on Mammalian Trypanosomes. IV Biometrical Study of the Relationship between *Trypanosoma uniforme* and *T. vivax* — *Trans Roy Soc Trop Med & Hyg* 1938, Mar 17 Vol. 31 No 5 pp 517-534 With 5 figs. [25 refs.]

The object of the observations recorded in this paper was to define the relationship between *T. uniforme* and *T. vivax* and to provide exact methods for their differentiation. Several strains of each species from different localities were studied. It was found that the strains corresponding to the two species fell into two distinct groups which are characterized constantly by differences in the mean lengths and in the range of lengths of the trypanosomes.

Histograms show the frequency distribution in respect of length of 500 specimens of *T. uniforme* and 700 of *T. vivax* with normal curves fitted to the data superimposed. The length of *T. uniforme* varied from 11 to 21 $\mu$  and that of *T. vivax* from 18 to 30 $\mu$ . The common range therefore extends from 18 to 21 $\mu$  but as is shown in a table from 90 to 100 per cent of the measurements of the various strains of both species lie outside these limits except in the case of one strain of *T. vivax*. Even in that special instance where 39 per cent of the measurements are within the zone of overlap it is noted that 29 of these are 20 $\mu$  whereas only two individuals of the total 500 *T. uniforme* reach that length.

The general conclusion from this part of the work is that it should be possible for practically all cases to differentiate the two species by measuring lengths of only 10 trypanosomes. If the mean length is less than 18 $\mu$  the infection is *T. uniforme*. If it is greater than 20 $\mu$  the infection is *T. vivax*.

The systematic position of the two groups of trypanosomes is discussed, and it is concluded that their original status as separate species *T. uniforme* and *T. vivax* should be retained.

The paper also contains an account of the previous records of *T. uniforme* together with a list of its hosts and its geographical distribution.

LLOYD (H. M.) The Occurrence of *Glossina morsitans* in Tanganyika Territory in Vegetational Types other than the *Isoberrhinia-brachystegia* Communities.—*Bull. Entom. Res.* 1933 Mar Vol. 29 Pt 1 pp. 77-68. With 3 figs. (1 map) & 2 plates. [17 refs.]

This paper which describes the relationship of *G. morsitans* to plant communities in several districts in Tanganyika Territory must be consulted in the original by those interested. The following general summary is given —

"1 Nine natural types of vegetation were noted in Karagwe and Ihangiro three of which were found to provide *G. morsitans* with a favourable habitat.

2. At Buhungukira seven natural types of vegetation were recorded, four of which are unfavourable as a habitat for *G. morsitans*.

3. *G. morsitans* can live in those favourable types independently of the proximity of an *Isoberrhinia-brachystegia* community.

"4. *G. morsitans* will not populate cultivated banana plantations in areas where favoured natural types of vegetation are present."

IV } }

GOLDING (F. D.) Notes on Blood-sucking Flies in the Ilorin Province, Nigeria.—*Bull. Entom. Res.* 1933. July Vol. 29 Pt. 2. pp 215-218. With 1 fig.

The objects of this paper are to compare the distribution of *Glossina* spp. in the Ilorin province in 1912 and 1937 and to record some data concerning the incidence of other biting Muscids and Tabanids. It must be consulted in the original by those interested. } }

GUIBERT (J. M.) Verpuppungsdauer von *Glossina palpalis*. [The Pupation Period of *G. palpalis*].—*Arch. f. Schiff- u. Trop. Hyg.* 1933. June. Vol. 42. No 6 p. 265. With 1 fig.

Five *G. palpalis* were caught on the Sanaga (Cameroons) on 15th February 1937 and fed in the laboratory on gumeapiga. On 24th February a pupa was found in the cage—this was removed and kept in dry sand at a temperature varying between 20° and 26°C. minimum and 26° and 30°C. maximum and a humidity varying between 65 and 88 per cent. It hatched on 27th March the pupation period being thus 31 days. It is recalled that in Brazzaville in 1909 ROUBAUD observed the pupation period at a temperature between 25° and 27°C. to be 32-33 days and at Dahomey in 1911 at a temperature between 28° and 30°C. to be 25-35 days.

IV }

SCHWETZ (J.) Sur un cas de trypanosomiase chez un nourrisson de moins de vingt jours. [A Case of Trypanosomiasis in a Baby of Less than 20 Days Old].—*Ann. Soc. Belge de Méd. Trop.* 1933. Mar 31 Vol. 18 No 1 pp 133-134.

About the middle of 1937 Schwetz examined blood films made by himself on the 20th October 1936 from 134 young infants at Boma. Trypanosomes were found in the blood of one of them—an infant less than 20 days old. The history showed that the child was born of healthy parents at Kalamu near Boma, where *G. palpalis* occur. It was therefore not a case of hereditary infection. Apparently the child remained in good clinical condition for at least six months but it is reported that it eventually died.

IV }

RAOULT (André) La coloration du sac ganglionnaire dans la recherche du trypanosome en équipe de prospection [The Staining of Gland Jutes in the Search for Trypanosomes by Itinerant Missions.] —*Ann de Méd et de Pharm Colon* 1938, Jan.-Feb.-Mar Vol. 36 No 1 pp 126-137

Experience has satisfied the author that the examination of stained preparations of gland juice give a larger proportion of positive results than does the examination of fresh coverslip preparations. In the present communication Raoult gives an account of the technique employed and of the results obtained. He also summarizes the practical advantages of the procedure.

The drop of gland juice is distributed as evenly as possible on a slide in the same manner as a thick blood film. After being thoroughly dried it is stained without previous fixation by a solution of Giemsa's stain (1 cc. to 20 cc. of distilled neutralized water) for a period of 25 minutes. The preparation is then rinsed with water and allowed to dry. It is then ready for examination. Such films are, of course, not so easy to examine as thin films, but the trypanosomes stain well and with a little practice can readily be picked out. A modification of the above method consists in making the ordinary fresh coverslip preparation and then, after it has been examined, gently removing the slip and staining the film adhering to the slide. This film has the advantage of being thin and consequently is more easy to examine, but, of course, these thin films are not so rich in trypanosomes as the thick films.

In all, this method of examination of stained preparations of gland juice has been performed on 13,354 individuals with puncturable glands found amongst a population of 127,974 natives. But the value of the method as compared with the older methods has been studied in only 6,273 patients with puncturable glands found amongst a population of 49,110. The following methods have been compared —

- (a) Examination of fresh gland juice
- (b) Examination of thin films of gland juice
- (c) Examination of thick films of gland juice.
- (d) Examination of stained thick blood films (Ross)
- (e) The triple centrifugation method of blood examination has been performed on suspected cases with negative gland juice.

The results of this laborious investigation are summarized in tabular form and the figures discussed in detail. The results obtained from the 6,273 patients with puncturable glands were briefly as follows —

*Method (a)* gave 283 (4.5 per cent.) positives. *Method (b)* 2,173 (34.6 per cent.) positives. *Method (c)* 2,212 (35.2 per cent.) positives and *method (d)* 3,151 (50.1 per cent.) positives. In all 3,683 patients out of the total of 6,273 were found to harbour trypanosomes by these four methods. In addition 84 positives were discovered by *method (e)* giving a grand total of 3,767.

From these figures it is possible to say that *method (d)* allowed 16.3 per cent. of cases to escape diagnosis. *Method (b)* 42.4 per cent. *Method (c)* 41.1 per cent. and *method (a)* 92.4 per cent. The general conclusion is that the thick blood film method of Ross is still the best method of examination, but that the method of examination of stained gland juice is much better than that of fresh gland juice. From further analysis of the figures it is concluded (1) when trypanosomes are found in the fresh gland juice they are almost always found

by the other methods and (2) when trypanosomes are found in stained gland juice they are usually found in the blood, but there are numerous exceptions.

The general inference to be drawn from this work is that in the field diagnosis should in the main rest on examination of thick blood films in conjunction with examination of stained preparations of gland juice.

W Y

GUIBERT (Jean) La ponction de la moelle osseuse excellente méthode pour la mise en évidence chez l'homme de *Trypanosoma gambiense*. Nécessité de la coloration de l'étalement du suc ganglionnaire [Bone-Marrow Puncture as an Excellent Method for the Diagnosis of Human Trypanosomiasis].—*Ann de Méd et de Pharm Colon* 1938 Jan-Feb-Mar Vol 36. No 1 pp 133-148 With 7 figs

VAN DEN BRANDEN (F) Examens comparatifs du sang et de la moelle osseuse des rats blancs infectés de *Trypanosoma brucei*. Déduction pour le diagnostic. [Comparative Examinations of the Blood and Bone-Marrow of Rats Infected with *T. brucei*].—*Ann. Soc Belge de Méd Trop* 1938 Mar 31 Vol 18 No. 1 pp. 139-142.

In this note Guibert describes the results of bone-marrow puncture in 20 cases of which 18 had already been diagnosed by the finding of trypanosomes by one or more of the classical methods. Trypanosomes were found in the bone-marrow of each of these 18 cases, but not in the other two in which other methods had failed. As a rule, the site of puncture was the mid-line of the body of the sternum about the level of the third rib.

Van den Branden examined the blood and bone-marrow of 25 rats infected with *T. brucei* on the fourth day of the disease. Trypanosomes were found in the blood of the animals but only on two occasions were they found in the bone-marrow. The author's general conclusion is that bone-marrow puncture is not likely to be of much value as a diagnostic measure.

W Y

BRUSSELET (Paul) & HENRIARD (Constant) L'hémoculture comme moyen auxiliaire de diagnostic de la maladie du sommeil. [Haemoculture as an Aid to the Diagnosis of Sleeping Sickness].—*C. R. Soc Biol* 1938 Vol 127 No 14 pp. 1469-1472.

Referring to recent work on the cultivation of trypanosomes [this *Bulletin* 1930 Vol 27 p 244 and 1935 Vol 32, p. 34] the authors state that one of the chief difficulties is the obtaining of the primary culture thus out of 30 attempts made by the authors only 11 were successful. They claim now to have overcome this difficulty by employing the "liquide Roche" instead of sodium citrate as the medium into which the blood is withdrawn.

The technique is as follows—Two solutions are prepared, viz., Ringer solution containing 0.06 per cent. NaCl and Tyrode solution. These solutions are distributed in the culture tubes in the proportion of 2 cc. of the former to 2.5 cc. of the latter and are then sterilized in the autoclave. To each tube is then added 2 cc. of citrated (1 per cent.) human blood, and the tubes are then incubated at 37°C. for 24 hours to ensure that they are sterile. This medium can be preserved on ice for

a fortnight or more. In order to obtain the blood for culture a solution of 1 per cent of polyanethol sulphonate of sodium or Liquefide Roche is used instead of sodium citrate.

The haemoculture is made by withdrawing 5 cc of blood from a vein into a syringe containing 1 cc. of Roche fluid. The mixture is then distributed in amounts of 0.5 cc. in each of about 10 culture tubes and the cultures are incubated at 25° to 28°C. Between the 10th and 20th day the flagellates are sufficiently numerous to be readily found.

Details are given of three instances—a man, a dog and a pig—in which this method of diagnosis proved useful. The authors claim that the technique has permitted them to obtain cultures regularly not only when the blood was relatively poor in trypanosomes but even when the ordinary methods of diagnosis had failed to reveal their presence. They recommend it as a method for the diagnosis of sleeping sickness.

IV Y

HOPE-GILL (C. W.) A Study of the Reaction Rate of the Serum-Formalin Reaction in *Trypanosoma gambiense* Sleeping Sickness.—*Trans Roy Soc Trop Med & Hyg* 1938. Mar 17 Vol. 31 No 5 pp 507-516 With 3 diagrams.

The author has examined the reaction of Gaté or, as it is better known, the serum formalin reaction as an aid in the diagnosis of human trypanosomiasis. A brief account is given of the previous work on the subject.

Preliminary experiments were made in order to ascertain the optimum conditions for the reaction as applied to human trypanosomiasis. It was found that in 1 cc. of serum 2 minims of commercial formalin gave a more rapid gel than the usual 1 minim, while the reaction was not accelerated by increasing the number of minims above 2. The following technique was therefore adopted—

Into a small test tube,  $\frac{1}{2}$  an inch in diameter (internal) by 3 inches in length was pipetted 1 cc. of serum or citrated plasma to which was added 2 minims of 40 per cent. (commercial) formalin. The test tube was then thoroughly shaken on account of the formalin having a tendency to settle at the bottom of the tube so resulting in a delayed gel. It was important that for these timed reactions there should be a definite and uniform end point. This was determined by gently inverting the tube without shaking. Failure of the contents to run down the side of the tube was regarded as a positive result.

Tests were performed on the following groups of cases—  
(1) Positive sleeping sickness cases in whom *T. gambiense* had been found.  
(2) apparently healthy natives in a fly free country and  
(3) out patients other than detected cases of human trypanosomiasis.

In Group 1 it was found that a positive gel was given within 5 minutes by 40 per cent of cases in 10 minutes by 59 per cent. in 15 minutes by 72 per cent. in 30 minutes by 82 per cent. and in 60 minutes by 93 per cent. Thus only 7 per cent. of positive sleeping sickness cases failed to give a reaction within 60 minutes.

In Group 2 only 1 of 41 people gave a positive gel within 60 minutes. The patients of Group 3 were tested and examined at Gadau the headquarters of the Tsetse Investigation. They were drawn from the surrounding country where sleeping sickness is endemic. Out of a total of 70 patients belonging to this group 16 gave a positive gel within varying periods up to 60 minutes. These 16 were not

suspected of trypanosomiasis before the serum-formalin reaction was performed. One of them, a case of leprosy disappeared before further investigation could be made, but the remaining 15 cases were further examined in order to discover whether any were suffering from undetected trypanosomiasis. As a result, 8 of the 15 cases were classed as undetected cases of trypanosomiasis, and the remaining 9 were considered to be free from the disease. It thus appeared that 9 (13 per cent.) of the series of 69 patients suffering from pathological conditions other than trypanosomiasis gave a positive reaction within 60 minutes.

Further work was undertaken to see whether therapeutic drugs influenced the reaction, or if syphilis interfered with it in any way. The conclusions are as follows —

"1 The serum-formalin reaction, when positive within 60 minutes under the conditions described, is strong evidence in favour of the presence of trypanosomiasis when negative within this time limit it is strong evidence against the presence of this disease and when negative after 24 hours is practically diagnostic of the absence of the disease.

"2 A serum-formalin reaction positive for trypanosomiasis is, therefore, one which within an hour gives a positive gel according to the technique described in this paper. This would apply to a country such as tropical Africa where *T. gambiense* sleeping sickness but not kala-azar which also gives a positive reaction, is endemic.

"3 The presence of Bayer 205 in the serum *in vivo* considerably retards the end point of the reaction.

"4 A retarding effect is also caused by previous treatment with trypanamide.

"5 The serum-formalin reaction gives no reliable information as to the progress of a case of human trypanosomiasis under treatment.

"6 The reaction takes place equally well whether serum or citrated plasma is employed.

"7 Interference by the presence of syphilis is negligible.

"8. These tests were carried out on the sera of patients who presented themselves voluntarily for treatment in a strongly endemic area, and the majority were therefore comparatively advanced cases of trypanosomiasis. It remains to be shown what results would be obtained in cases diagnosed in the course of a mass examination where many cases complain of no symptoms and are often only mildly affected by the disease."

IV Y

GUIBERT (J M) La réaction de Pandy dans la trypanosomiasis humaine. [Pandy's Reaction in Human Trypanosomiasis].—*Ann de Méd et de Pharm. Colon.* 1938 Jan.-Feb-Mar Vol. 36. No. 1 pp. 241-250 With 3 figs

The author states that the idea of attempting to apply the reaction of Pandy for estimation of the degree of alteration in the cerebrospinal fluid in human trypanosomiasis occurred to him as long ago as the beginning of 1932. He gives an account of the technique used by him. Flat-bottomed insect tubes 55 mm. in height and 8 mm. in diameter are placed in a suitable rack. To each tube is added 2 cc. of Pandy's reagent (carboic acid crystals 10 gm. + distilled water 150 cc.) and the 0.1 cc. of the cerebrospinal fluid to be tested. The rack is then placed in a simple home-made nepheloscope, consisting essentially of a box, the interior of which is black with a suitable window cut in one side. The readings are made at about 0.5 to 1.0 metre from a window which does not receive the direct rays of the sun, by holding the box about 30 cm. from the eyes at the level of the

abdomen and inclining it slightly towards the ceiling. The examination of the fluid is not made by looking through the centre of the tubes but by looking at the circle in the depth of the tube which the liquid forms at its superior meniscus. This circle is of course smaller than the actual diameter of the tube. The following are the author's interpretations of the various appearances —

1. If it is black the reaction is negative
2. If it is greyish the reaction is feebly positive and corresponds in the majority of cases to a few elements and a protein value (Sicard and Cantaloupe) of 0.22 to 0.3 gm. per litre
3. If it is definitely bluish the reaction is positive and corresponds to at least 10 cells and a protein value of 0.3 to 0.4 gm.
4. If the blue tinge tends to become white the reaction is strongly positive and corresponds to more than 10 cells and about 0.3 to 0.5 gm. of protein per litre
5. Finally if the white cloud is so dense that it is not possible to perceive the circle the reaction is very strongly positive and corresponds to a protein value of more than 0.5 gm. per litre and to cells almost always exceeding 50 per cmm.

Guibert considers that in view of its simplicity and the speed with which it can be used this reaction would be of great service for itinerant missions working on sleeping sickness diagnosis and treatment.

IV Y

BEAUTÈS. Service de prophylaxie et de traitement de la trypanosomiase dans le Nord Dahomey [Prophylaxis and Treatment of Sleeping Sickness in North Dahomey]—*Ann de Méd et de Pharm Colon* 1933. Jan-Feb-Mar Vol. 36 No 1 pp 21-84 With 13 figs. & 16 charts.

The discovery of sleeping sickness in North Dahomey is of recent date and up to 1926 the disease had apparently attracted little attention. In 1927 an inquiry was instituted and a few cases were found but it was not until September 1928 that any organization was formed for dealing with the disease. A general description of the work done since that date is given and a summary of the activities of the various itinerant missions is shown in the following table —

Year	Population	Old cases	New cases	Lumbar punctures	Treated	Total number of injections.
1932	59 096	1 015	2,171	0	1 927	12,343
1933	69,596	744	2,018	0	4 705	40 287
1934	81,391	2,972	1 128	0	4 251	61 028
1935	88 660	1,592	756	1 966	4 272	46 901
1936	68 552	3,361	1 629	5 164	5 096	66 127

The next portion of the report deals in detail with the state of affairs in the different regions into which North Dahomey has been divided and this is followed by an account of the treatment which has been employed.

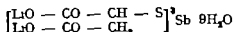
The article is mainly of local importance and must be consulted in the original by those interested.

IV Y



BERTRAND (Y) Essais du mélange anthiomaline-moranyl dans le traitement de la trypanosomiase humaine. [Anthiomaline-Moranyl Mixture in the Treatment of Sleeping Sickness.]—*Bull. Soc. Path. Exot.* 1933. June 8. Vol. 31 No. 6. pp 522-532.

Anthiomaline is antimony III thiomalate of lithium and has the formula



The mixture consists of a powder put up in sealed ampoules containing 0.25 gm. or 0.5 gm. and prepared according to the two following formulae —

Powder A composed of moranyl 10 gm. + anthiomaline 0.6 gm.  
Powder B composed of moranyl 10 gm. + anthiomaline 1.8 gm

The powder used is dissolved in 20 times its weight of water and the injections are given intravenously at weekly intervals. The author states that he has given 510 such injections without any untoward result. Powder B employed in doses of 2 cgm per kilo (not exceeding 1.5 gm.) is the more active and should be used exclusively. The number of injections which should be given is not decided, but the author has aimed at giving 10 weekly injections.

In all, 34 cases were treated by this substance and details of a number are given. Apparently the mixture is of little use in cases with changed cerebrospinal fluid but for the purpose of producing peripheral sterilization it is a compound of the first order. It has also given excellent results in the peripheral sterilization of cases resistant to trypanamide.

W. Y.

RADMA (R) Sur le traitement de la forme nerveuse de la trypanosomiase humaine. [The Treatment of the Nervous Stage of Trypanosomiasis.]—*Ann. Soc. Belges de Méd. Trop.* 1938. Mar 31 Vol. 18 No. 1 pp. 75-79.

After discussing briefly the difficulty of successfully treating nervous cases of sleeping sickness, the author assumes that this is due to the fact that the drugs cannot pass the meningeal barrier. In order to increase the permeability of this barrier in syphilis SCHACHERL (1937) has given intrathecal injections of neosalvarsan whilst other authors employed horse serum.

Radma has followed Schacherl's technique and has injected 7 sleeping sickness cases with 1 mgm. of arsbenzyl into the spinal canal. The drug is dissolved in 1 cc. of distilled water and 9 cc. of cerebrospinal fluid. The injection should be given slowly and the patient kept in the horizontal position for 24 hours afterwards. It is emphasized that the injection has no specific action, but simply destroys the barrier between the blood and the cerebrospinal fluid (how it does this is not stated). The intrathecal injection was subsequently followed by a course of treatment with moranyl and trystibine.

Of the 7 cases so treated 6 had previously had various courses of moranyl, trypomanyl, trystibine etc., without any effect on the nervous state. Details are given of the new method of treatment.

Apparently all the cases were greatly improved in health and the spinal fluid brought back to the normal state as regards cells and protein content

W Y

CHRISTOPHERS (S Rickard) & FULTON (J D) Observations on the Respiratory Metabolism of Malaria Parasites and Trypanosomes.—*Ann Trop Med & Parasit* 1938 Apr 28 Vol. 32. No 1 pp 43-75 With 1 chart [18 refs]

This paper deals with the normal respiratory metabolism of *Trypanosoma rhodesiense* and *Plasmodium knowlesi*. The authors' observations on trypanosomes which confirm those of the reviewer and other workers are summarized as follows —

The most striking feature of trypanosome metabolism under the conditions noted is the utilization of glucose the formation of acid products and the large oxygen uptake. There appears to be no difference in the nature or degree of these processes between the normal and arsenic fast strains.

Deprivation of glucose is followed at once by cessation of  $O_2$  uptake and the normal content of glucose in a mixture of one part rabbit serum to three of total fluid is insufficient for full continued activity of these organisms beyond about 15-30 minutes at 37°.

The reduction in pH due to acid formation appears to be the cause even in presence of glucose, of a gradual reduction in  $O_2$  uptake causing an increasing departure from the linear graph of such uptake. This fall-off in uptake is corrected by addition of alkali (buffer) and is less when horse serum with stronger buffering action than rabbit serum, is used.

A mixture at 37°C. containing 54 000 trypanosomes per  $\mu$ l suspended in rabbit serum, Ringer and buffer with 0.2 per cent. added glucose showed initially a mean  $O_2$  uptake for normal strain (53 observations) of 19.4 ml.  $O_2$  per  $10^{10}$  trypanosomes per hour and for the arsenic strain (27 observations) one of 18.6 ml. per  $10^{10}$  trypanosomes per hour. In terms of dry weight, the value was 235 ml.  $O_2$  per gm. per hour (arsenic strain 275 ml. per gm. per hour)  $Q_{O_2} = 285$ .

This rate was not significantly different with pure (heated and unheated) serum or horse serum in place of rabbit serum or relatively within limits with differing quantities of material in the suspension.

The ratio of glucose used, and acid produced, to  $O_2$  uptake was respectively about 1 and 2.

The respiratory quotient was very small, under 0.2, in both normal and arsenic fast strains.

Deprived of glucose trypanosomes rapidly become motionless deformed and lysed. No enzyme bringing about  $O_2$  uptake could be demonstrated from material lysed by water or by freezing and thawing. Addition of glucose to organisms deprived of this substance for more than 15-30 minutes did not lead to renewal of  $O_2$  uptake by the suspension. Cessation of movement, lysis and disappearance of enzyme action, as evidenced by  $O_2$  uptake are in trypanosomes closely related and are brought about as rapidly and effectively by deprivation of glucose as by addition of lethal drugs.

We have confirmed the fact as noted by Fenyvessy and Reiner (1924) that KCN has no inhibitory action on respiration.

The next portion of the paper deals with *Plasmodium knowlesi*. The authors state that so far as they are aware no observations have been recorded on the respiration of malaria parasites. A detailed account is given of the technique employed. In all except special cases the 3.0 ml. of mixture in the experimental flasks contained 1.0 ml. standard suspension of parasite substance in monkey serum.

1.0 ml. Ringer solution, and 1.0 ml. m/15 phosphate buffer pH 7.4. No glucose was normally added. The control-flask mixture was identical, except that serum was used in place of suspension. Two strengths of suspension were commonly used, namely one of parasite substance in three of serum, giving in the flask 0.25 ml. of parasite substance, and a weaker suspension of one to nine of serum, giving in the flask 0.1 ml. parasite substance.

In order to obtain the parasite substance monkeys freshly inoculated were kept under observation until the parasites in the primary attack had increased so greatly that death was threatened. At this point when 25 per cent. or more of the red cells were infected by the large forms of parasites the animal was sacrificed and as much blood as possible (60 to 80 ml.) collected and defibrinated. Defibrinated blood, after filtering through gauze was then centrifuged at about 2,000 r.p.m. for 45 minutes whereby the large forms of the parasite separate as a brown layer above the red cells. This layer on examination is found to consist almost entirely of parasites from half to three-quarters grown or more. The brown layer was then pipetted off and centrifuged, as before for a further 45 minutes in graduated tubes of small bore containing about 2 ml. of material. The considerable volume of brown material so obtained sharply differentiated from the red cells can then be removed in required measured amounts. It is this deposit which is referred to by the authors as "parasite substance." Although the parasite substance so far prepared contains a few leucocytes and a few uninfected red cells, the volume of these is relatively very small compared with the mass of parasitized red cells and though some smaller parasites may be present the larger forms greatly predominate. Typical percentage differential accounts are given showing the relative uniformity of the product.

In the preparation of parasite substance a very striking feature is the rapidity with which blood containing numerous parasites darkens becoming chocolate-coloured or even almost black. NAUSS and YORKE (1911) observed a darkening of the red cells when trypanosomes were present due to the taking up of oxygen by these parasites. The blackening of the blood containing *P. knowlesi* was however far greater than the authors have ever seen with the most heavily infected trypanosome blood. On shaking such blood or deposit it largely regains its bright red colour but rapidly darkens again.

Inoculation of animals with mixtures containing parasite blood after two hours shaking in the Barcroft manometer gives rise to infection as with fresh blood.

The authors summarize their observations on this parasite substance as follows —

"The most outstanding feature of  $O_2$  uptake by parasite substance is its steady continuance, with little or no falling off for very considerable periods, in the absence of added glucose and apparently independently of the normal presence of this substance, either in the serum or in the red cell.

That oxygen can be obtained from the oxyhaemoglobin of the cell is clearly shown by the remarkable change in colour when parasitized cells are excluded from contact with air. This change in colour indicating reduction of oxyhaemoglobin, is far more rapid and marked than that seen with trypanosomes in blood, as first observed by Nauss and Yorke (1911) and the process in the case of parasites must be one of great intensity.

Whether this action is dependent upon the presence of an oxydase upon that of an auto-oxidizable substance stored in the parasite, or upon

some form of oxidizable and reducible substance (hydrogen carrier) and whether in the latter case the system works through a concomitant dehydrogenase enzyme we are as yet not in a position to say.

Our observations however show that in medium containing parasites (1) there is a very considerable consumption of  $O_2$ , (2) there is an approximately equal output of  $CO_2$ , (3) haemoglobin is altered, if not actually split up, (4) non protein nitrogen is increased. Our observations also show (5) that there is no formation of acid comparable to that produced by trypanosomes, (6) that there is no detectable increase in  $NH_3$ . Further we have shown that (7) serum appears to play but little part in providing the requirements of  $O_2$  uptake and that (8) the parasite can readily take oxygen from the oxyhaemoglobin of the cell.

W Y

FULTON (J D) & CHRISTOPHERS (S Rickard) The Inhibitive Effect of Drugs upon Oxygen Uptake by Trypanosomes (*Trypanosoma rhodesiense*) and Malaria Parasites (*Plasmodium knowlesi*)—*Ann. Trop Med & Parasit* 1933 Apr 28. Vol. 32. No 1 pp 77-93 [13 refs]

The observations recorded in this paper deal with the quantitative effect of known concentrations of various drugs and chemical compounds in reducing or entirely inhibiting oxygen uptake by *T. rhodesiense* and *P. knowlesi*.

The following summary of this work is given—

"Certain drugs and compounds have been found at definite concentrations to cause inhibition of  $O_2$  uptake both by trypanosomes and malaria parasites. By employing standard conditions such inhibition experiments give results which can be expressed as a coefficient of inhibition. While the inhibition always increases with concentration of the drug no definite mathematical relationship between the two quantities has so far been apparent. But by plotting the logarithm of the concentration against that for the inhibition value a sigmoid type of curve is obtained.

That the effect is to some degree parallel to therapeutic effect, and may be related to this is suggested from several considerations. Thus the effects with trypanosomes are exactly parallel to those obtained by Yorke and his co-workers, who have clearly shown that the effectiveness *in vivo* is closely parallel to effectiveness therapeutically. In the case of malaria parasites the known anti-malarial drugs are effective inhibitors whilst a number of other bases are not. Methylene blue and acriflavine are effective *in vitro* as they are therapeutically and in some cases the relative effectiveness *in vitro* appears to be the same as therapeutically. "8," atebriin is some 5-10 times more effective as an inhibitor than quinine. There is thus the possibility that in some cases at least the inhibition observed *in vitro* is a measure of an identical process taking place in the body when the drug is effective therapeutically.

It would seem that the methods used by us constitute a very delicate means of studying lethality through drug action *in vitro* in other words the  $O_2$  uptake gives so far as can be ascertained, a continuous record of lethal effect by the drug.

"The method is rapid precise and gives repeatable results, and indicates whether a drug has a direct toxic effect. Whether the drug acts in the same way in the body may be complicated by other factors. The method also provides a ready means of telling whether a strain is arsenic-fast. From previous results the  $O_2$  uptake appears in practice to depend on the organisms being alive and how far abolition of respiration is equivalent to death is not quite clear. The two processes seem to be intimately connected.

W Y

FRENCH (M. H.) Studies in Animal Trypanosomiasis. I. Nitrogen and Mineral Metabolic Disturbances Induced by *Trypanosoma congolense* and *Trypanosoma brucei*. II. Disturbances produced in the Plasma Proteins by *Trypanosoma congolense* and *Trypanosoma brucei*. III. The Effects of *Trypanosoma congolense* and *Trypanosoma brucei* on Blood Urea.—*Jl Comp Path & Therap* 1933. Mar Vol. 51 Pt. 1 pp 23-35 36-41 [14 refs.] 42-45 [11 refs.]

The observations recorded in these three papers were made on the larger farm animals infected with *T. brucei* or *T. congolense*.

The first paper considers the effect of the infections on the calcium, magnesium potassium sodium and chlorine, and phosphate balances. The conclusion reached is that the infections in cattle and sheep caused an increased excretion of nitrogen body bases chlorides and phosphates.

The second paper is concerned with the changes produced in the plasma proteins. The following conclusions were reached —

" 1 Marked disturbances occur in the plasma protein proportional distribution during infection of cattle sheep donkeys and guinea-pigs with *Trypanosoma congolense* and *Trypanosoma brucei*. Details are given of the compositions of normal blood and the changes produced during the different infections on varying nutritional levels.

" 2 The total plasma protein content did not vary in any constant manner.

3 The non-protein nitrogen showed an increase only at crisis or near death. An increase in N.P.N. followed antimosan injections.

4 The proportional amount of fibrinogen is not influenced by trypanosome infections.

5 The relative proportions of the albumin fraction decrease during infection, reaching a minimum value at death or crisis. During recovery from crisis the albumin percentage returns to normal in from five to eight weeks.

6 With the decrease of albumin, the proportional amounts of total globulin increase. This increase is due to the great increase in the relative proportions of euglobulin. With the passing of crisis the euglobulin percentage returns to normal in from 10 to 12 weeks.

7 The plasma protein changes are greater in *T. brucei* than in *T. congolense* infections. Similarly the changes are greater in acute than in mild cases of trypanosomiasis.

In the last paper the author examines the effects of the infections on the blood urea, and reaches the conclusion that there is no alteration of the blood urea content as a result of the infection of cattle and sheep by *Trypanosoma congolense* and *Trypanosoma brucei*. IV Y

VON BRAND (Theodor) The Metabolism of Pathogenic Trypanosomes and the Carbohydrate Metabolism of their Hosts.—*Quarterly Rev Biol* 1933. Mar Vol. 13 No. 1 pp 41-50 With 1 fig [71 refs.]

This paper gives an excellent review of the work which has been done on the metabolism of the pathogenic trypanosomes and of the problem of the relationships of this metabolism to the injuries suffered by the host during infection. The following conclusions are drawn —

1 The carbohydrate metabolism of the pathogenic trypanosomes is characterized by its great intensity and also by the fact that the sugar is only partially oxidized in the presence of oxygen.

2. The carbohydrate metabolism of a mammal infected with pathogenic trypanosomes is disturbed, as shown mainly by the disequilibrium of the blood-sugar lowering of the glycogen reserves and reduced ability to build glycogen from sugar.

3. Four theories have been presented to explain the disturbance of the carbohydrate metabolism of the host and its eventual death three of which involve metabolic interrelationships of parasites and host. According to one the loss of carbohydrate suffered by the body from the sugar consumption of the parasites is responsible for the injuries of the host another claims that a supposed end product of the sugar metabolism of the trypanosomes (lactic acid) is the causative factor. The third theory assumes that toxins perhaps originating from the protein metabolism of the parasites play the decisive rôle in the pathogenicity of these organisms.

W. Y.

TUNG (T.) & MA (Y. C.) Hyperlipemia in Experimental Trypanosomiasis of Rabbits.—*Proc Soc Experim Biol & Med* 1938 Feb Vol 38, No 1 pp 103-106 [12 refs]

The work described in this paper was undertaken to determine whether there is any change in the plasma lipoids of rabbits infected with *T. brucei*. Results of the experiments are summarized in a table. It is seen that spontaneous variation in the total lipoid and cholesterol content occurs in the blood plasma of control rabbits but the change was never significant.

In the animals of the test series there was a considerable increase both in the lipoid and cholesterol content in 4 of the 5 rabbits. The maximal increases of total lipoid were 33, 18, 5 and 3 times the control figures. Increases in the total cholesterol up to 10, 6, 3 and 2 times the control figures were also observed. Normally the ratio of total lipoid to total cholesterol was 4 to 1 but after the infection was well established in 3 animals the ratio changed to 12, 11 and 6 to 1 respectively. These figures indicate that the fatty constituents of the blood plasma, other than cholesterol, were markedly increased.

H. Y.

OYO (S.) Ueber die Wirkung der Kaltblutsera auf die Kultur trypanosomen. IV. Mitteilung Ueber die antitrypanolytische Wirkung des Kaninchen Immunserums und einige Experimente ueber die Serumfestigkeit der Kulturtrypanosomen. [The Action of the Sera of Cold-Blooded Animals on Culture Trypanosomes. IV. On the Antitrypanolytic Action of Rabbit Immune Serum, and Some Experiments on the Serum Resistance of Culture Trypanosomes.]—*Fukuoka Acta Med* (Fukuoka Ikudangaku-Zasshi) 1938 Mar Vol. 31 No 3 [In Japanese pp 313-328. [14 refs.] German summary pp 25-26.]

A description is given of observations on the influence of immune rabbit serum on the trypanolytic, agglomerating haemolytic and haemagglutinating action of various cold-blooded sera experiments are also recorded describing the preparation of a serum fast strain of culture trypanosomes.

It was found that the serum of rabbits which had been immunized against turtle serum inhibited the trypanolytic or haemolytic action of turtle and some other cold-blooded animals but that it had no influence on the agglomerating or haemagglutinating action of the same animals.

The long continued addition of fresh cold-blooded serum to cultures of trypanosomes failed to increase the resistance of the parasites to the fresh cold-blooded serum but against the inactivated serum the trypanosomes became definitely resistant in that they were only with difficulty agglomerated and they failed to die as readily as usual in the concentrated serum. H J

TUXO (T) *In vitro* Photodynamic Action of Methylene Blue on *Trypanosoma brucei*.—*Proc Soc Experim Biol & Med* 1938. Feb Vol. 38 No 1 pp 29-31 With 1 fig

As a result of a brief review of the literature dealing with the *in vitro* photodynamic action of acridine dyes on micro-organisms the author concludes that the various papers deal almost exclusively with the effect of the photodynamic action on the motility of the protozoa. He considers that motility alone cannot be taken as the criterion of the life or death of treated organisms and he has therefore considered it of interest to re-study the *in vitro* photodynamic action of methylene blue on *T. brucei*.

A suspension of *T. brucei* in the citrated plasma of guineapigs was mixed with various dilutions of a citrated solution of methylene blue in the proportion of 9 to 1 respectively. Part of the mixture contained in a Petri dish was put over a Frigidaire cooling machine and exposed to 100-watt lamp at a distance of 10 cm. for one hour. The other portion of the mixture was kept unexposed as a control. The motility of the exposed and unexposed *T. brucei* was examined at the end of 30 and 60 minutes respectively. After one hour 0.5 cc. of each of the exposed and unexposed mixtures were injected intra-peritoneally into a series of white mice. The following results were obtained—

- (a) Methylene blue up to dilution of 1:100,000 in the presence of light was sufficient to immobilize *Trypanosoma brucei* whereas, without light this dye could only exert a similar effect in a concentration of 1:100.
- (b) Sixty minutes of exposure yielded results similar to a 30-minute exposure.
- (c) The immobilizing effect of the dye was parallel to its lethal activity.
- (d) All the mixtures containing immobilized trypanosomes failed to produce infection in white mice. Furthermore animals infected with trypanosomes treated with the photodynamic action of methylene blue in a dilution insufficient to immobilize the organisms were found to have a longer incubation period and survival than the control ones.

The photodynamic action of methylene blue exhibited a curious preservative effect on *T. brucei*. As examined in stained smears, the cellular structure of the photodynamically treated trypanosomes kept at 37°C for a month was almost comparable to that of the fresh organisms. H Y

DANGERFIELD (William Gardner) GAUNT (William Eric) & WORMALL (Arthur). Studies on Bayer 205 (Germanin) and Antirypol. I. The Determination of Small Amounts of Bayer 205 (and Antirypol). II. The Persistence of Bayer 205 in the Blood Stream after Injection into Animals.—*Biochem J* 1938 Jan Vol. 32 No 1 pp 59-70 With 1 fig [13 refs]

In view of the prophylactic action of Bayer 205 (and Antirypol) against trypanosomiasis the Conference on Tsetse and Trypanosomiasis Research held at Entebbe (1934) expressed the view that it was

important that the question of the rapidity of excretion of Bayer 205 from the body should be investigated and it was recommended that the Medical Research Council should be approached with the request to work on this problem. The present work is the result of this request.

The first problem which confronted the authors was to discover an accurate method for the determination of Bayer 205 in plasma and other body fluids. The method described gives satisfactory results with plasma but considerable difficulties were encountered when attempts were made to apply it to urine. The present report therefore confines itself to the retention of Bayer 205 and the mode of elimination is left to a future date. The methods which are described in detail must be consulted in the original by those interested.

The second part of the paper is concerned with the persistence of Bayer 205 in the blood stream after injection into animals.

The following summary is given —

1. A method based on that introduced by Lang (1931) is described for the determination of Bayer 205. The Bayer 205 is hydrolysed by strong HCl and the amines produced are diazotized and coupled with methyl- $\alpha$  naphthylamine. The red colour produced is compared colorimetrically with those obtained from standard solutions of hydrolysed Bayer 205.

2. Amounts of Bayer 205 as low as 0.2 mg/100 ml. in water (or a quantity of 0.004 mg) can readily be detected and accurate determinations made when the concentration exceeds 0.6 mg/100 ml. With blood plasma amounts greater than 0.6 mg/100 ml can be determined with sufficient accuracy. Owing to a high and variable blank value it has not yet been possible to adopt this method for the determination of Bayer 205 in urine.

3. Antypol (B D H) behaves exactly like Bayer 205 when hydrolysed and determined by this method. The rates of hydrolysis of these two preparations by HCl are practically identical.

4. After intravenous injection of Bayer 205 into rabbits and dogs, the amount of the drug in the plasma falls rapidly during the first few days owing in part to excretion in the urine but after this initial period the diminution is less rapid.

5. Five or six months after the intravenous injection into a rabbit of a relatively large dose of Bayer 205 (0.1 g. per kg) there is still a significant amount of the drug in the plasma (at least 1 mg/100 ml). Two injections, each of 0.03 g. per kg. into a dog resulted in a plasma Bayer 205 level of 0.8 mg. or more per 100 ml. for 14 weeks after the first injection.

6. Preliminary experiments have shown that rabbits which have received several smaller doses of Bayer 205 over a period of a few weeks have more Bayer 205 in their plasma in the later stages of the experiment than have rabbits which received one injection of the same total amount. In these experiments five injections each of 0.028 g. per kg. maintained the average level of Bayer 205 above 4 mg/100 ml. of plasma for about 9 weeks after the first injection, and after 20 weeks the level was still above 1 mg/100 ml.

7. The significance of these small amounts of Bayer 205 in the plasma is discussed in relation to the figures given by other authors for the minimum *in vitro* trypanocidal concentration of this drug. In view of the recent finding of Hawking (1937) that concentrations of 10 mg/100 ml. and sometimes as low as 1 mg/100 ml. destroy the power of trypanosomes to infect mice it is suggested that the amount of Bayer 205 found in the plasma of an animal several months after a course of injections may be sufficient to account for the marked prophylactic action of this drug.



BROZZI (Silvio) Contributo alla chemioterapia della tripanosomiasi sperimentale. [Chemotherapy of Experimentally Produced Trypanosomiasis.]—*Boll Istituto Sieroterap Milanese* 1938. Mar Vol. 17 No. 3. pp. 175-182. With 2 figs. on 1 plate. German summary

The test animals employed by the author were guineapigs the drugs were colloidal zinc, silver and copper and the infection *T. brucei*. The experiments were performed to find out whether Petragnam's results on bacteria might be applied to protozoal infections. The doses given ranged up to 5 cc. of a preparation of strength 10 gm. of the metal in 400 cc. distilled water. All three preparations exerted a definite lytic action but that with the copper preparation was the most marked. It acted both *in vitro* and *in vivo* particularly a preparation called *Zimocuprolo* and infected animals were "rapidly cured." Thirty guineapigs were used in one experiment. 10 were given 1.5 cc. intravenously every three days 10 the same subcutaneously and 10 were left as controls. The last all died in 8-9 days. Those who had it subcutaneously developed large abscesses and seven died probably from these, as very few parasites could be found in the blood. The other three of this group were well a month later and the blood was free of parasites (at least none could be seen). Of the first group 3 died with haemopericardium (these had also received intracardiac injections) 7 were living and well, and examination of their blood showed no parasites. The authors intend to test it in other protozoal infections.

H H S

BROWNING (Paul) The Chemotherapeutic Action of Synthalin, in Experimental Infections with *T. brucei* and *T. congolense*.—*Jl Path & Bact* 1938 Mar Vol. 48 No. 2. pp. 323-329 [13 refs.]

The author gives the following summary of his work —

1 The observation that an aliphatic compound decamethylene diguanidine hydrochloride (synthalm) has chemotherapeutic action in mice infected with *T. brucei* has been confirmed. The therapeutic result was as marked with an amacetin-resistant strain as with the same strain before being rendered resistant to the drug.

2 Infections due to two different strains of *T. congolense* in mice were also influenced by the administration of synthalm. When repeated doses of the drug were given at daily intervals, however relapses occurred eventually in the course of the treatment. Relapses were also found to resist further treatment with the drug.

3 Slight hypoglycaemia occurs in untreated mice chronically infected with *T. congolense* but the infection persists in spite of this. The degree of hypoglycaemia is similar to that in uninfected mice treated respectively with synthalm and with guanidine but only the former of these drugs has chemotherapeutic action. The above facts do not support the view that the chemotherapeutic action of synthalm is due exclusively or chiefly to its effect on the blood sugar of the host. This conclusion is in conformity with Lounie and Yorke's observation that synthalm is highly trypanocidal *in vitro*. [this Bulletin 1938 Vol. 35 p. 342] W J

VAN SACEGHEM (R.) L'immunisation des bovins contre la trypanosomiose. [Immunization of Cattle against Trypanosomiasis.]—*Bull Soc Path Exot* 1938 Apr 6 Vol. 31 No. 4. pp. 296-298

The author records a few experiments from which he infers that when a calf of less than a month old is inoculated with a strain of

*T. congolense* passed through a guinea pig or rabbit there results a benign infection which lasts several months and terminates in spontaneous cure leaving a real immunity. The object of passing the strain through small laboratory animals is not to attenuate it but to eliminate infections such as piroplasma, peculiar to the ox.

W Y

TALIAFERRO (William H) The Effects of Splenectomy and Blockade on the Passive Transfer of Antibodies against *Trypanosoma lewisi*.—*Jl Infect Dis* 1938 Jan.-Feb Vol. 62 No 1 pp 98-111 [23 refs.]

The fundamental problem involved in this work is the possible functional rôle of the macrophages in the passive transfer of anti-lewisi antibodies. Taliaferro considers that the present experiments are of particular interest not only in illustrating the extent of the cellular co-operation in the passive transfer of antibodies but also because they involve antibodies transferred to the same species in which they were produced (i.e. the antibody is not in a foreign serum) and they contrast the action of a trypanocidal antibody which has the general characteristics of parasitocidal antibodies and an ablastin or reproduction inhibiting antibody which, although similar in most characteristics differs from other antibodies in that it possesses no demonstrable *in vitro* affinity with its antigen.

This paper which is of a technical nature should be consulted in the original by those interested.

The author gives the following summary —

*Bartonella* infected rats were generally used to enhance the effects of splenectomy and blockade in the experiments reported in this paper.

Passive transfer of ablastin (the reproduction-inhibiting antibody) takes place as effectively in splenectomized rats intensively blocked with India ink as in normal rats.

Passive immunity with ablastin lasts for only a few days. In normal rats it is augmented and replaced by a developing active ablastic immunity whereas in splenectomized and blocked rats active ablastic immunity does not develop to any marked extent.

In contrast to results with ablastin the passive transfer of the trypanocidal antibody is slightly but definitely impaired in splenectomized and blocked animals as compared to normal rats.

Passive immunity with the trypanocidal antibody lasts for only a few days. In this case also a few trypanosomes which may survive do not reproduce in normal rats due to the development of an active ablastic immunity whereas they actively multiply in splenectomized and blocked rats because ablastic immunity fails to develop.

Trypanosomes sensitized with specific trypanocidal antibody and injected intravenously are removed from the circulation as quickly in splenectomized and blocked as in normal rats but this does not prove that eventual disposal of the parasites is identical because the parasites may be agglutinated and mechanically removed.

W Y

STRÖDER (Josef) Ueber den Einfluss der Kompression auf Trypanosomen und den Verlauf einer experimentellen Trypanosomeninfektion. [The Influence of Compression on Trypanosomes and on the Course of Experimental Infections].—*Ztschr f Immunitätsf u Experim Therap* 1938 June 11 Vol. 93 No 2 pp 145-154 [13 refs.]

The author has subjected suspensions of trypanosomes to high pressures for a period of 5 minutes and has studied the morphological

changes produced and the change if any in the infection produced by the compressed trypanosomes.

After a pressure of 300 atmospheres the compressed suspensions contained fewer trypanosomes than the controls but the pressure-resistant trypanosomes were not changed morphologically and a pressure of as much as 800 atmospheres scarcely produced any change. With still higher pressures there was a tendency for the parasites to become rounded, and this was complete at pressures of 1,300 atmospheres. Still further increasing the pressure resulted in complete immobility and rounding up of the trypanosomes.

Trypanosomes subjected to pressures of 800 atmospheres produced normal infections in mice and rabbits after 1 100 atmospheres pressure the parasites no longer infected rabbits but to make them non-pathogenic for mice the pressure had to be increased to 1 400 atmospheres H 1

MAZZA (Salvador) Nuestra experiencia sobre la enfermedad de Chagas en la República Argentina. [Chagas Disease in the Argentine.]—Reprinted from *Festschrift Bernhard Nocht* 2. 80 Geburtstag von seinen Freunden u. Schülern Hamburg 1937 pp 305-308.

This brief article formed one of the contributions to the Festschrift volume of Professor Nocht. It sums up the incidence of Chagas disease to date, but adds nothing new—it does not profess to. Between 1932 and 1936 the number of acute cases recorded amounted to 109. In the succeeding ten months to June 1937 this total was more than doubled, 131 more being reported during that period. The distribution by Province is detailed as follows the number of fatal cases being given in brackets —

Mendoza 67 (2) Santa Fé 46 (5) Santiago del Estero 27 (2) Chaco 25 (0) Jujuy 16 (3) Catamarca 12 (0) La Rioja 10 (1) Salta 9 (0) San Juan 7 (1) Formosa 6 (0) Tucumán 6 (0) Corrientes 3 (0) Córdoba 3 (0) Entre Ríos 2 (0) and Neuquén 1 (0)

The fatality rate is thus only 5.6 per cent. In most of the dwellings occupied by the patients, puppies and kittens were found naturally infected by *T. cruzi*. Many wild animals also showed infection notably opossums, armadillos and weasels (mustelidae). [See also this Bulletin 1937 Vol. 34 p. 278 et seq.] H H S

MAZZA (Salvador) BASSO (Germinal) & BASSO (Redento) Investigaciones sobre la enfermedad de Chagas en provincia La Rioja. II. Indices comparados de infestación por *S. cruzi* de triatomídeos de dormitorios y gallineros en las provincias La Rioja y Catamarca. Presencia de *E. ornaldi* en gallineros de la primera. [Indices of Infestation by *T. cruzi* of Triatoma in Bedrooms, Poultry-Yards and Dove-Cotes in La Rioja (Argentine).]—Universidad Buenos Aires. Misión de Estudios de Patología Regional Argentina Jujuy 1938. Publicación No. 37 pp 34-41. With 2 figs.

Of 1 722 specimens of *T. infestans* 833 adults, 636 nymphs and 253 larvae captured in the sleeping rooms of dwellings in La Rioja, a total of 576 or 33 per cent. were found infected. 300 (36 per cent.) of the adults, 220 (24) nymphs and 56 (22) larvae. A detailed table gives the respective figures for nine localities in the Province. The percentages found positive in Triatoma captured in poultry-yards and

dove-cotes were much smaller but the total number examined was little more than one-tenth that of the dwelling rooms. One hundred and seventy nine were examined. 82 adults 17 of which (20 per cent) were infected. 64 nymphs 4 (6 per cent.) positive and 33 larvae of which only two were positive together 23 or 12 per cent.

In a few rabbit warrens examined 31 *T. infestans* were captured and 27 were infected. 15 out of 16 adults 11 out of 14 nymphs and the single larva examined. The rate of infection of the bug in this Province is therefore high. H H S

MAZZA (Salvador) & JORO (Miguel E.) Investigaciones sobre la enfermedad de Chagas. Tercera nota sobre *Triatomidae* (Hemipt. Het. Reduviidae) argentinos. [Chagas Disease. Argentine *Triatomidae*].—*Universidad Buenos Aires. Misión de Estudios de Patología Regional Argentina. Jujuy* 1938. Publicación No 38 pp 26-58. With 21 figs. & 6 plates (1 coloured).

WOOD (Fae D.) & WOOD (Sherwin F.) On the Distribution of *Trypanosoma cruzi* Chagas in the Southwestern United States.—*Amer. J. Trop. Med.* 1938 Mar. Vol. 18 No 2 pp 207-212. With 1 fig.

The blood of wood rats and the faeces of cone-nose bugs from their nests were examined microscopically for *T. cruzi*. A relatively wide range of territory in Arizona New Mexico Texas and Utah was sampled in order to determine whether the disease was general or localized.

In all, the faeces of 287 cone-nose bugs and the blood of 60 rodents were examined without finding any evidence of the infection. Specimens of the bugs were infected experimentally in the laboratory with both the Californian and Brazilian strains of *T. cruzi*. W Y

LIEM SOEI DIONG Onderzoekingen over *Triatoma infestans* als overbrenger van enkele pathogene organismen en over de complementbindingreactie bij de ziekte van Chagas. [*Triatoma infestans* as Vector of Pathogenic Organisms and the Complement Fixation Reaction in Chagas Disease]. [Thesis for Doctorate of Medicine Univ of Leiden].—150 pp. With 7 figs. (5 on 1 plate) [152 refs.] English summary. 1938. Utrecht. Kemink en Zoon. N V.

A doctorate thesis of necessity enters into elaborate explanation of the state of knowledge antecedent to the commencement of the special research carried out. This is so in the present instance and the author gives a very good exposition of Chagas disease. Even in his first publication Chagas described the pathogenicity of the virus for monkeys and guinea-pigs. Other animals such as white mice young dogs and young cats are also susceptible. As regards the complement fixation reaction which is one of the subjects of study by the author the antigen to be used is a matter of considerable importance. MACHADO used a watery extract of the spleen of infected young dogs. Non-specific reactions proved not infrequent in the tests. Another type of antigen was obtained by KESLER from a culture of *Trypanosoma cruzi* on BONACCI's medium. This antigen had the advantage that it could be preserved in the ice chest for a month after which it lost titre. Some element of personal danger however attached to the use of this organ extract. The antigen prepared by the author was a

dry culture antigen. Condensation fluid of 14-day cultures was collected centrifuged and the centrifugate dried first at 37°C. and then over sulphuric acid. The dried material was filled into ampoules and, as the results showed, could be preserved for more than a year.

One of the headings of the first chapter is 'What happened in Hamburg and the Netherlands East Indies?' Up to 1935 it had been held that the *Trypanosoma cruzi* and Chagas disease were to be found only in tropical America. In 1935 however MALAMOS when searching for malaria parasites in monkeys (*Macacus cynomolgus*) in Hamburg, discovered trypanosomes in the blood which he identified with *T. cruzi*. But these monkeys had come from the Netherlands Indies. They had been only one or two days in the dealer's hands before being bought and had travelled direct through the Suez canal, not through America. The possibility of the animals having been infected in the Institute itself was not entertained and the only remaining possibility seemed to be that Chagas disease may be endemic and unrecognized in Java. Actually the bug *Triatoma rubrofasciata* is found in Java and was shown to harbour trypanosomes, but these have, so far only been identified as *T. conorhini* (Donovan.)

At this point the author sets out his own researches which were, for various reasons, not directed to proving the existence of Chagas disease in the Dutch East Indies but the subsidiary ones of showing (1) how *Triatoma* bugs are efficient carriers of organisms and so may transmit disease and (2) the practical utility of the complement fixation reaction in trypanosome infection. *Triatoma infestans* was the bug used and experiments on infectivity or, as the case may be, transmissibility were conducted with a paratyphoid organism of Aertrycke type, some saprophytic acid-fast bacteria, *Spirochaeta duttoni* and *Leptospira icterohaemorrhagiae*. It was shown that paratyphoid organisms could proliferate in the gastro-intestinal canal and could be demonstrated in the body of the bug for at least 132 days after the infective meal; acid fast bacilli were still living in the gut for 41 days. The spirochaetal tests gave somewhat similar results. By inoculation of infected bugs it was demonstrated that Well leptospirae after a sojourn in *Triatoma infestans* of 3 and 4 days could infect mice and indeed, that the bugs were still infective on the 11th, 13th, 14th and 20th days. In the use of the bacterial experiments not only was there good reason to believe in the infectivity of the faecal discharges of the bugs but also that the bite might also transmit infection. The mechanism in the latter case appeared to be similar to that of plague, in which the proventriculus of the flea becomes blocked and infection of the wound made by biting takes place by regurgitation of organisms. It was not found possible to infect by biting in the case of *Spirochaeta duttoni* and *Leptospira icterohaemorrhagiae* although viability of these organisms was demonstrable for some days in the body of the infected bug. Thus evidence is forthcoming at least that triatoma bugs may be of epidemiological importance.

IV F Harvey

LUNDEBERG (Earl R.) A Fatal Case of Chagas Disease occurring in a Man 77 Years of Age.—*Amer J Trop Med* 1938. Mar Vol 18 No 2 pp 185-196 With 3 figs. [12 refs]

This paper gives a full account of the post-mortem findings at the autopsy on a black farmer aged 77 who had lived on the Panama

Isthmus for 30 years. The patient had been sick with fever and swelling of the legs and stomach for five days before death. He had had occasional spells of fever during recent years but otherwise his health was thought to have been good. He died suddenly on the way to hospital and the autopsy was performed two hours later in order to ascertain the cause of death.

The following summary of the post-mortem findings is given —

"Acute myocarditis due to *Schizotrypanum cruzi* hypertrophy and dilatation of heart edema, subcutaneous marked effusion, pleural, pericardial and peritoneal passive congestion of liver and spleen focal encephalitis (mid-brain only) due to *Schizotrypanum cruzi* glandular hyperplasia of prostate intestinal helminthiasis congestion and edema of intestines obliterative pleural adhesions of left lung

*Cause of death* Chagas disease (*Schizotrypanum cruzi*)

*Contributory* Acute myocarditis Acute dilatation of heart.

*Leishmania* forms of *T. cruzi* were found in the heart brain and prostate. The important parasitic lesions were confined to the heart and mid-brain.

It is noted that this is the first fatal case of Chagas disease found in an adult Panamanian it indicates that in Panama, as elsewhere the effects of the disease may be serious in adults as well as in infants

IV 1

MAZZA (Salvador) BASSO (Germinal) BASSO (Redento) & CHAMBOULEYRON (Emilio J) Investigaciones sobre la enfermedad de Chagas I Segundo caso mortal de forma aguda de enfermedad de Chagas comprobado en Mendoza. [Second Fatal Case of Acute Chagas' Disease in Mendoza].—*Universidad Buenos Aires Misión de Estudios de Patología Regional Argentina Jujuy* 1938. Publicación No 36 pp 3-25 With 24 figs

The patient was an infant of two months who died on the sixth day of disease during an attack of convulsions. The post-mortem findings are described with the usual careful detail of the authors and the account is illustrated by a series of very good photomicrographs. The most noteworthy point is that a meningo-choroiditis was present with encephalitis this has been repeatedly observed in experimental work and in the natural infection of animals but not hitherto in human cases. The other pathological lesions were typical.

H H S

LACORTE (J Guilherme) A reação de Machado na moléstia de Chagas [Machado Reaction in Chagas Disease].—*Acta Med Rio de Janeiro* 1938 Mar Vol 1 No 3 pp 264-274 [12 refs] English summary

In the present series of observations Lacorte used the technique employed in his earlier work (1926). The antigen was prepared from the spleen of a well-infected puppy. The reaction was examined in 35 patients who were either suspected or definitely diagnosed to be suffering from Chagas disease. Positive results were obtained in 68.5 per cent. of cases. In 35 control patients including 30 who gave a positive Wassermann reaction and 5 who gave a negative Wassermann reaction, the Machado reaction was negative in every instance.

The general conclusion is that the Machado reaction when carried out properly affords a valuable method for the diagnosis of Chagas disease. W Y

LWORY (Marguerite) L'hématine et l'acide ascorbique, facteurs de croissance pour le flagellé *Schizotrypanum cruzi* [Hematin and Ascorbic Acid as Growth Factors for *Trypanosoma cruzi*].—*C R Acad Sci* 1938 Feb 14 Vol 206 No 7 pp 540-542.

Experimenting with cultures of *Trypanosoma cruzi* the author has determined that abundant growth will take place in serum to which is added both hematin and ascorbic acid. The suppression of either or both of these substances interferes seriously with the cultures. These two substances appear to be essential factors in the growth of this trypanosome. The serum also contains an essential factor for its removal is likewise injurious. What the substance is in the serum has not been discovered, but it is thought that it is possibly cholesterol. Similar results were obtained with cultures of *Leishmania tropica*.

C M Werryon

JOHNSON (Carl M.) Cardiac Changes in Dogs experimentally infected with *Trypanosoma cruzi*.—*Amer J Trop Med* 1938 Mar Vol 18 No 2 pp 197-208 12 refs<sup>1</sup>

Since it has not been found possible to study the lesions which occur in chronic Chagas disease in man the author has followed the infection in dogs experimentally infected with the parasite. In view of the similarity of the lesions in the two hosts during the acute stage there is very likely a definite parallelism in the chronic stage.

In all, 19 dogs were used in this study. 10 were infected with Strain O and 9 with the human Strains D and M. The number of acute infections was 9 and that of the chronic infections was 11. A detailed account is given of the lesions produced by each strain. In dogs the parasite gives rise to a parenchymatous myocarditis with an accompanying interstitial reaction. The changes may be of an acute character or they may be of a sub-acute or chronic type in which the lesions are distinctly focal in nature and less destructive in character. The lesions are initiated by the invasion and subsequent rupture of the muscle fibre by the parasite but until actual rupture of the fibre takes place no alteration in its structure occurs and no surrounding cellular infiltration is occasioned. Upon rupture of the cardiac fibres and liberation of the parasites, the focal lesion so characteristic of this infection is formed.

Johnson could find no evidence that the lesions were the result of toxins produced by the parasites. In his opinion the damage observed could readily be accounted for on the basis of the mechanical action of the parasites. The lesions were present in greater numbers in some areas than in others. In all the hearts the focal lesions were most numerous in the layers adjacent to the epicardium and endocardium near the atriculo-ventricular junction. The central and apical portions showed much less involvement. In acute cases this finding although marked by the more or less diffuse character of the interstitial reaction, is nevertheless present.

Definite pathological changes were found in the hearts of dogs in which trypanosomes had been absent from the circulation for periods as long as 538 days. The changes differed from those of the acute cases only in extent and intensity. The characteristic focal round-cell inflammatory lesions were present although few in number. Scarring is also seen in the chronic form. Parasites were very rare and usually not found in microscopic examination of the tissues but the presence of the focal lesions and the fact that the complement fixation tests are positive leave little doubt as to their presence even though they cannot be demonstrated microscopically.

W. I.



## MALARIA.

COVELL (G) *The Malaria Survey of India, 1927-1937 — JI Malaria Inst. of India (formerly Records of the Malaria Survey of India)* 1938. Mar Vol. 1 No. 1 pp 1-31 With 4 plates.

The Malaria Survey of India, whose contributions to malaria research during the last ten years have been large alike in quantity and importance, will henceforth be known as The Malaria Institute of India. Hitherto it had been financed by the Indian Research Fund Association. Now it has been taken over by the Government of India, as regards its public health and advisory functions. The present review of the work carried out by the Survey since its inception in 1927 is by its Director.

An interesting summary is given of the history of malaria research in India since the discovery by Ross of the mosquito cycle of the malaria parasite at the close of last century. The events are described which led to the creation of the Malaria Survey of India. This institution owed its conception to CHRISTOPHERS and the reputation which it has earned as a research organisation is attributed in large measure to the able and energetic direction of SIMON.

Mention is made of the staff of the Survey which has served it so well during the ten years and the functions of the Survey are described. The publications it has issued and the special researches and malaria surveys it has carried out are detailed. The amount of productive work that has been accomplished is truly astonishing. The mere catalogue of achievement is sufficient testimony to the value of the services rendered to the health of India and to malariaology. The review closes with a description of the field experimental station at Karnal and of the annual malaria classes held there.

It is a proud record

Norman White

BARBER (M. A.) & RICE (J. B.) *Malaria in Poona and in its Vicinity — JI Malaria Inst. of India (formerly Records of the Malaria Survey of India)* 1938. Mar Vol. 1 No. 1 pp. 37-55

This is a report of an interesting malaria survey of Poona and its vicinity that was carried out between 4th February and 1st August, 1937 including the whole of the hot weather and some six weeks of the rainy season. It did not include the period of maximum malaria transmission which is probably at the end of the rainy season. To determine the amount of malaria a large number of children from 1 to 15 years of age were examined and the parasite rates, the spleen rates and the macroscopic anaemia indexes are recorded for different localities. These rates are for urban areas situated on a river 11.9, 11.9 and 17.4 for urban areas distant from a river 2.0, 4.4 and 4.8 for rural irrigated areas 37.6, 47.4 and 22.8 for rural non-irrigated areas 10.2, 11.7 and 18.5. Barber's index of microscopic anaemia is based on the number of abnormal erythrocytes stainable in the manner characteristic of retained nuclear material. In thick films stained by Giemsa these erythrocytes appear as blue clouds and the number of such clouds in a thick film determines the grade of macroscopic anaemia. The correlation between macroscopic anaemia so determined and the haemoglobin index (Dare haemoglobinometer) is plus  $0.438 \pm 0.022$ .

Of the 647 parasite-positive films examined there were 227 *vivax*, 244 *falciparum*, 163 *malariae* and 13 mixed. The following percentages

of splenomegaly occurred in children harbouring the parasites named—*vicax* 57 *falciparum* 66 *malariae* 84 and mixed 100. The examination of very young infants gave no evidence of malaria transmission during the hot dry season.

*Anopheles* collected included the following species—*annularis* *barbirostris* *culicifacies* *fluvialis* *hyrcanus* *jamesi* *maculatus* *mogkulensis* *pallidus* *splendens* *stephensi* *subpictus* *theobaldi* *turk* *kudsi* and *ragus*. Of the 6 000 adults captured in daytime resting places *culicifacies* formed 50.1 per cent. *subpictus* 39.7 per cent. *stephensi* 3.5 per cent. *fluvialis* 2.6 per cent. *annularis* 1.8 per cent. The number of *Anopheles* dissected was 1 640. Only three were found infected all *culicifacies* and all with sporozoites. Precipitin tests gave a small proportion of human-positive results for three species only *culicifacies* *subpictus* and *fluvialis*. *A. culicifacies* is the most important vector. *A. fluvialis* may be important in some seasons and localities.

A certain number of children in villages where malaria indices were comparatively high were re-examined in the early monsoon season a time of the year when there is normally an increase of clinical cases. There was found to be a small but significant increase in the parasite rate little change in the spleen rate and a two-fold increase in the microscopic anaemia index. This may be explained by the effect of meteorological conditions on the resistance of an infected people.

As *addenda* to this paper are descriptions of technique which should prove useful. For catching mosquitoes in thatched ceilings use is made of a large white umbrella of which the handle is cut off a few centimetres below the catch. It is opened and held bottom-side-up close to the thatch while the thatch is being sprayed with a culicide. For high ceilings a length of bamboo is fitted to the peak of the umbrella.

In bringing small larvae of mosquitoes to maturity in the laboratory the following food-supply has been found useful. A tall glass vessel is filled one-third with garden earth and then to the brim with tap water. A piece of coarse mosquito netting is tied over the top. Within a few days the culture is swarming with bacteria and infusoria. The water containing them is then poured into the larva cultures thus feeding the larvae and replenishing the water. The vessel is then refilled with water and can be used again and again.

In examining larvae a small piece of Cellophane may be used as a cover-slip. It is just heavy enough to immobilize larvae without crushing them.

BRASIER-CREAGH (E. B.) Aerial War on the Mosquito. An Account of the Work undertaken by the Mosquito Patrol in India—*Popular Flying* 1938 May Vol. 7 No 2. pp 70-73. With 5 figs. N IV

The author is a pilot who has collaborated with the Malaria Survey of India in distributing Paris green from the air over large areas of flooded land near Delhi. He describes alterations which are necessary to the aeroplane and what is required for flight. The most suitable machine available was a D.H. 83 Fox Moth in which it was found possible to carry 336 pounds of diluted Paris green. Details are given of the structural modifications which made it possible.

to carry and distribute the powder. It appears that the powder was lifted from the hopper and expelled by the use of a Venturi tube, no agitation inside the hopper being necessary. Arrangements for releasing the cloud of dust over the slide were not perhaps as convenient as might be. During the first flight the pilot suffered from inhaling the dust and his skin was irritated over certain areas where it had settled. In subsequent flights he wore a complete canvas suit and a gas helmet.

The distribution of the powder over the marsh was tested by a large number of dishes containing larvae—glass microscope slides were also put out and subsequently examined for particles of Paris green. Details are given of flights back and forth over the flooded areas. The author points out that the work is technically difficult. The pilot must be skilful and keen for he has to fly low and if possible, slowly—he ought also to have a knowledge of the ground and of the day to day changes in the position of the flood water. A good many technical details require to be worked out and in this the pilot must collaborate with the entomologist. With fuller knowledge the value of the method would be greatly increased.

The paper concludes with suggestions for future work, and the view is expressed that it would be most satisfactorily done by 2-engined monoplanes with hoppers and Venturi tubes in the wings. The cost for treating large areas provided they are not very far from the aerodrome may be 2s to 3s per acre (presumably this means per visit, which might be once a week during the season of transmission).

P. A. BURTON

SEX (P). *Anopheles sundais* (Ludlow) and Malaria in Calcutta.—*Jl Malaria Inst of India* (formerly *Records of the Malaria Survey of India*) 1938 Mar Vol 1 No 1 pp 83-88

Calcutta experienced an outbreak of malaria of unusual severity more especially in the eastern part of the city during the autumn of 1936 as did villages situated near the east and south-east of the municipal boundary. Certain information about this outbreak is recorded. *A. sundais* was responsible—the prevalence of this anopheline is increasing in and around Calcutta. N. H.

MARNEFFE. Notes sur le paludisme à Java. [Notes on Malaria in Java].—*Ann de Méd et de Pharm. Colon* 1937 Oct.-Nov-Dec. Vol 35 No 4 pp 1335-1357 With 3 maps.

A well written account of malaria in Java, its epidemiology and the remarkable results obtained in recent years in diminishing its prevalence. The paper is the result of a profitable study tour so obviously contains nothing original. All the facts recorded have been published elsewhere.

N. H.

MARTIAL (J. E.). Le paludisme à Lang Son. [Malaria in Lang Son].—*Ann de Méd et de Pharm. Colon* 1937 Oct.-Nov-Dec Vol 35 No 4 pp 1132-1208 With 2 figs [15 refs.]

The province of Lang Son lies along the eastern frontier of Tonking with China. It is hilly country hills from 300 to 800 metres high, with here and there a few peaks reaching or exceeding 1 000 metres.

There are two well marked seasons a cold dry season when the north monsoon is blowing and a hot damp season interrupted in July and August by plentiful rain. The population is 150 000 mostly Thais among whom malaria has been endemic for a long time past. *A. minimus* the chief vector is widespread. Malaria is most prevalent in the vicinity of limestone hills and most severe among the immigrant Annamite population. It is by far the chief cause of sickness and is responsible for 21 per cent of all visits to hospital. It is most prevalent in October and least in evidence at the end of the cold dry season in March. Temperature appears to be responsible for the annual regression of the endemic when the temperature falls below 18°C the incidence falls when it rises above 20°C malaria increases *P. falciparum* is responsible for 42 per cent. of cases *malariae* 33 per cent and *vivax* 25 per cent. The disease has recently shown a diminishing prevalence especially among the troops stationed there. Prophylactic quinine and mechanical protection against mosquitoes are used. Anti-larval measures are extended each year

N II

MOHR (Werner) Zur Frage der Entstehung einer Epilepsie nach Malaria [Regarding the Origin of Epilepsy following Malaria].—*Deut Med Woch* 1938. July 15 Vol 64 No 29 pp 1030-1033 [41 refs]

Epilepsy following malaria has been described by many writers. The author reports in detail on two cases of malaria followed by epileptic attacks. In neither case was there any history of hereditary taint. One patient contracted malaria in 1916 and the first epileptic attack followed one year later with recurrences. There was loss of consciousness wide fixed pupils absent corneal reflex and foaming at the mouth short spasms and later muscle rigidity. Bakmiski's sign was negative in the attack which lasted 3-4 minutes and was followed by headache and affected speech. In the second case malaria was diagnosed in 1917 and the first epileptic attack took place in 1920 the spleen being then enlarged.

The literature regarding the relation of malaria to epilepsy is cited and the pathological anatomy of the disease described which however is not characteristic of malaria alone. The inflammatory disturbance due to circulating toxins is stressed. Other brain damage seen post mortem in malaria cases are petechial haemorrhages capillary and perivascular changes glial proliferation, destruction of ganglion cells focal softening and the presence of malarial granulomas in relation to cell filled capillaries. Return to normal is not always possible and scar tissue may arise in the brain substance. These findings as well as laying down of calcium may not always be seen post mortem. Parasites and pigment may be scanty. Both benign and malignant tertian malaria may be responsible but such findings are rare in quartan malaria. The symptoms are sometimes those of meningitis with numerous lymphoid cells in the C.S.F. From the resulting destruction of brain substance manifold symptoms of C.N.S. disturbance may arise with equally numerous diagnoses including epileptiform attacks. The epileptiform attacks may follow the malaria at widely different intervals. The author stresses the importance of diagnosing true epilepsy which is said to occur always

before the 20th year. Short mention is made of cases in the literature treated by inoculation malaria for epilepsy already present and the results are not encouraging.

J. D. Fulton

LORANDO (N.) CHANTOTIS (N.) & CHOREFTIS (P.) Purpura et palm  
disme [Purpura and Malaria.]—*Bull. Soc. Path. Exot.* 1938  
Apr. 6 Vol. 31 No. 4 pp. 290-294 [11 refs.]

This is the description of a case of malaria, *Pl. vivax* infection in a woman aged 49 in which each febrile attack was followed by an urticarial eruption accompanied by the appearance of purpuric patches. The whole skin was covered by a measles-like eruption interspersed with urticaria patches intensely irritable and with localized oedema, with here and there violet red patches of confluent petechiae on an ecchymotic discolouration of the skin. These purpuro-ecchymotic patches varied in size from 5 square centimetres to the size of the palm of a hand. There were no haematological findings, other than the presence of malaria parasites which could explain the capillary haemorrhages. The authors believe that the increased permeability of the capillaries in their case was an anaphylactic phenomenon in a patient who had been sensitized by the proteins of the malaria antigen.

N. H.

BROWN (Alan) GRIFFITHS (T. H. D.) ERWIN (Stanley) & DYRENFORTH  
(Lucien V.) Arthus's Phenomenon from Mosquito Bites. Report  
of a Case with Experimental Studies.—*Southern Med. J.* 1938.  
June. Vol. 31 No. 6 pp. 590-595 With 2 figs. [14 refs.]

This is an account of exceptionally severe reaction to mosquito bites in a girl aged 15 the mosquito being *Aedes aegypti*, the reaction being considered by the authors to be a local anaphylactic phenomenon, the phenomenon of Arthus. Severe reaction to mosquito bites was noted when the child was but 2½ years old the bite was followed by the formation of blebs varying in size up to that of half a dollar. The size and duration of the blebs had increased as the child grew older mosquito bites were invariably followed by swelling which lasted from 5 to 7 days involving an area from one to two inches in diameter. When the child was nine years old the process was further complicated by necrosis of the inoculated area, followed by scar formation and hardening of the tissue. The induration persisted long after the mosquito season. In hospital the child was bitten experimentally by three *A. aegypti*. Severe reaction followed the temperature rose to 102°F and the pulse rate to 110. Seventeen days later the necrotic plugs began to separate leaving pea-sized cavities which eventually healed, leaving scars like large pock-marks. Other mosquitoes caused less severe reaction. Attempts were made to desensitize the patient by inoculations with glycerinated extracts of mosquito salivary glands and of the whole mosquito in gradually increasing doses, but the benefit conferred was only temporary. The injection of epinephrin immediately after a mosquito bite lessened the reaction. Biopsy revealed the eosinophilic infiltration, in and about the necrotic areas characteristic of allergic reactions. Partial passive local immunization was obtained by the intradermal injection of the serum of a person with normal reaction to mosquito bites. [The patient eventually died of a condition that was diagnosed post-mortem as Hanot's cutaneous.]

A. H.

- KIKUTH (W) Endotheliale Schizogonie bei Hühnermalaria (*P. gallinaceum*) E Brumpt 1935 [Endothelial Schizogony in Fowl Malaria (*P. gallinaceum*)]—Zent f Bak I. Abt. Orig 1937 Vol 140 No 3/8 Beiheft pp 227\*-229\*

With reference to *Plasmodium gallinaceum* the malarial parasite of fowls described originally by BRUMPT the author of this paper confirms this observer's account of the parasite and gives some notes on the characters of the organism, the intensity of the infections and the readiness with which it develops in *Aedes aegypti*. The pigmentless schizonts noted first by JAMES and TATE in these parasites have also been seen to occur both in infections resulting from blood inoculations and in those following injection of sporozoites. The number of these endothelial schizonts to be found in any bird does not bear any relation to the intensity of the blood infection. In the case of two other malarial parasites of birds *P. cathemerium* and a strain of *P. praecox* isolated from a greenfinch similar endothelial schizonts have been found in the brain kidney lung liver heart and bone marrow 72 hours after sporozoite injection. The author considers that it is not yet settled whether these endothelial schizonts represent the developmental stages which occur between the injection of sporozoites and the appearance of parasites in the red blood corpuscles.

C M Wenyon

- KIKUTH (Walter) & MUDROW (Lilly) Ueber pigmentlose schizogonieformen bei Vogelmalarien. [Non-pigmented Schizogony Forms in Bird Malaria.]—Klin Woch 1937 Nov 27 Vol 16 No 48 pp 1690-1691 With 1 fig

The paper records the discovery of pigmentless endothelial schizonts of *Plasmodium cathemerium* in experimentally infected canaries. The forms occurred after injection of sporozoites and the blood or organ emulsions of other infected birds. The number of these forms present in the internal organs increased with the severity of the blood infection. In one case a bird died 48 hours after the injection of sporozoites before the pigmented forms had appeared in the blood. In this case non-pigmented schizonts were found in small numbers in the organs. The isolated schizonts were also found in the case of two strains of *P. praecox* from a greenfinch and a crow. The authors do not favour the view that these endothelial schizonts are the result of mixed infections and belong to parasites other than those of malaria.

C M W

- GUSSELL (Winton Elizabeth) Variations in Gametocyte Production in Avian Malaria.—Amer J Trop Med 1937 Sept. Vol 17 No 5 pp 689-726. With 5 text figs & 13 figs. on 1 plate. [50 refs]

The author of this paper has made a detailed study of gametogenesis in two species of bird malaria—*P. cathemerium* and *P. relictum* var. *malutinum*. It has been shown that it is possible to recognize the pregametocytes and that at each schizogony of the asexual forms which in these species takes place at 24-hour intervals appear pregametocytes which reach maturity 6 to 10 hours later. There is thus a periodicity in gametocyte production. Strains vary in their

capacity to produce gametocytes but it was not found possible to alter this capacity for any particular strain. When the time of schizogony was changed by cultivation in light and darkness the appearance of gametocytes still coincided with the segmentation time. Repeated passages by blood inoculations mosquito transmissions prolonged latency of three years duration in one bird, injection of serum from a bird infected with one strain into a bird infected with another mixing the strain with another strain which produces no gametocytes all failed to bring about any change in the degree to which a strain produced gametocytes. A careful comparison of the merozoites of a strain of *P. cathemerium* which produced no gametocytes with those of a normal strain did not lead to the detection of any forms of the normal strain which might be supposed to be the youngest form of gametocytes. A strain which was started from a single cell by STAUBER produced gametocytes in the normal manner an observation which shows that the gametocytes are in any case offshoots of asexual forms. Spontaneous changes however may occur as evidenced by the sudden failure of Stauber's strain to produce gametocytes in one bird. It was found that three other birds inoculated from the same source also failed to show gametocytes. It is suggested that the explanation of gametocyte production may be found in nuclear and chromosome changes for the study of which in such minute organisms there is at present no satisfactory technique. C M IV

CHORINE (V) Modifications sériques chez les poules au cours de l'infection due au *Plasmodium gallinaceum* [Serum Changes in Fowls Infected with *P. gallinaceum*.]—C R Soc Biol 1938 Vol 127 No 13 pp 1189-1191

The author has found that the blood of fowls infected with *Plasmodium gallinaceum* reveals a diminution of the euglobulin content. Occasionally there is a slight increase but in any case the variation from the normal is a slight one. On the other hand there is a marked increase in the pseudoglobulin content, producing a definite hyperglobulinaemia. In human malaria on the other hand there is a great increase in the euglobulin which is reflected in Henry's reaction which on this account is markedly positive. C M IV

HEGNER (Robert) & WOLFSON (Fruma) *Toxoplasma*-like Parasites in Canaries Infected with *Plasmodium*—*Amer J Hyg* 1938 Jan Vol 27 No 1 pp. 212-220 With 20 figs. on 2 plates. [22 refs.]

In the various descriptions which have been given of schizogony of bird malarial parasites in endothelial and other similar cells the authors think that sufficient consideration has not been given to the possibility of the occurrence of mixed infections with malarial parasites and toxoplasms. The figures which have been published of the endothelial schizonts are compared with developmental stages of toxoplasms and it is concluded that these are often very similar if not indistinguishable. They consider that further observations will have to be made before it can be concluded that the endothelial schizonts actually belong to the malarial parasites and not to toxoplasms which are relatively common parasites of birds and readily inoculable from one bird to another. Instances of known occurrence of toxoplasms in canaries with or without associated plasmodial infections are quoted. C M IV

- BUTLER (Gladwin Albert Hurst) HENRY (Thomas Anderson)  
 SOLOMON (William) TREVAN (John William) & GIBBS (Egbert  
 Meade) The Action of the Cinchona and Certain Other Alkaloids  
 In Bird Malaria. III.—*Biochem J* 1938 Jan Vol. 32  
 No 1 pp 47-58 With 1 fig [33 refs]

The paper deals with the action of cinchona alkaloids and certain derivatives of these on bird malaria. It has been found that changes in the vinyl side-chain in quinine and quinidine do not alter the antimalarial action but that any interference with the central -CHOH group partially or completely destroys it even when there is only a change in spatial distribution as in the conversion of quinine into Rabe's *epi-C*-quinine. In an homologous series of apoquinine or dihydrocuprein alkyl esters antimalarial action does not rise to a maximum and then fall as the series is ascended, but this behaviour is shown in an alternating series each with its own numbers of carbon atoms forming two series produced changes in maximum. Other structural modifications did not follow any rule. Those who are interested in antimalarial substances will have to consult the original paper which illustrates the difficulties of this type of work which aims at the discovery of definite correlations between chemical constitution and therapeutic activity  
 C M IV

- MANWELL (Reginald D) Reciprocal Immunity in the Avian Malarias.  
 —*Amer J Hyg* 1938 Jan Vol. 27 No 1 pp. 196-211  
 [38 refs]

Working with nine different species of bird malarial parasites in aviaries the author has tested the cross immunity reactions. One species *P. dongatum* was peculiar in that an infection with it gave no protection to any of the others and conversely none of the others gave any immunity to *P. dongatum*. Four of the parasites were small species like *P. rouxi* and these gave protection against each other a fact that indicates a close relationship both physiologically and morphologically. The immunity produced by the small species protected against *P. calhemerum* but not against the morphologically related *P. praecox*. Certain species induce an immunity to some species but not to others. Working with a number of strains of one species *P. circumflexum* it was found that one strain protected against all the others to a very marked degree  
 C M IV

- MOSNA (Ezio) La trasmissione del *Plasmodium knowlesi* a scimmie africane. (Transmission of *Plasmodium knowlesi* to African Monkeys.)—*Riv di Parassit* Rome. 1938 Jan. Vol. 2. No 1  
 pp 45-48 English summary (6 lines)

With the object of discovering a suitable host for *Plasmodium knowlesi* other than *Macacus rhesus* the following African monkeys were inoculated: *Papio cynocephalus*, *Cercopithecus griseo viridis*, *Cercopithecus cephus*. Though infections of varying intensity were produced in all these monkeys none proved to be as satisfactory for experimental purposes as the Indian *Macacus rhesus*  
 (1019)  
 C M IV



DAS GUPTA (B. M.) Experimental Investigation into the Duration of Tolerance to Re-Infection in Monkey Malaria.—*Indian Med Gaz* 1937 Dec. Vol. 72. No. 12. pp. 728-728.

It has been demonstrated by MULLIGAN and SIXTON that the inoculation of rhesus monkeys with *Plasmodium knowlesi* is followed by severe infections which can be rendered chronic by suitable anti-malarial treatment. Re-inoculation of such recovered animals, which are actually still carriers of the malarial parasite, is not followed by any marked increase in the parasites present in the blood if the strain of parasites is the same as that used at the first inoculation. If on the other hand another strain is employed then an infection as severe as the original one will result. The author of the present paper has tried to discover how long this immunity to an homologous strain persists.

There were available two monkeys which had been re-inoculated a number of times with a strain of *P. knowlesi* and which had developed an immunity to re-inoculation parasites in small numbers being demonstrable in the blood. There then ensued a period of fourteen months during which no re-inoculations or blood examinations were made. Intensive blood examinations were then made but no parasites could be found. After six months, blood from one of the monkeys was inoculated to a new rhesus monkey but no infection occurred. It appeared as if the original infection had died out. The monkey was then inoculated with the original strain of parasite and acquired an acute and fatal infection. The second monkey was similarly re-inoculated after a year's continuous negative blood examinations and like the first monkey developed an acute infection which in this case was arrested by treatment.

The conclusion is arrived at that the immunity to any particular strain persists only so long as parasites remain in the body. With complete eradication of infection immunity is lost. C. M. W.

SMOKE (H. E.) & MEXON (K. Padmanabha) An Acridine Compound (Acr. X) in the Treatment of Monkey Malaria.—*Records of the Malaria Survey of India* 1937 Dec. Vol. 7. No. 4. pp. 253-265.

Being supplied with a drug "Acr. X," an acridine compound which was said to be related to atebain, the authors carried out with it and atebain a series of therapeutic tests in monkeys infected with *Plasmodium knowlesi*. It was found that the action of the drugs was precisely the same, while a chemical analysis carried out appeared to indicate that "Acr. X" was actually atebain. C. M. W.

YOKU (M.) Note on the Experimental Infection of *Anopheles clutus* with *Plasmodium falciparum* by feeding through a Prepared Animal Membrane.—*Riv di Malarologia* Sez. I 1938. Vol. 17. No. 1. pp. 62-68.

A technique has been devised for infecting mosquitoes by ingestion of malarial gametocytes in defibrinated blood. A membrane prepared from the skin of a rabbit's ear is stretched over one end of a tube into which the blood is introduced. Starved anopheles feed readily through the membrane. Gametocytes of *P. falciparum* kept in

defibrinated blood for five hours at 23 to 27°C or for seventy two hours at ice box temperature were still infective to the mosquitoes.

C M IV

LOTZE (Harald) Klinisch-experimentelle Untersuchungen bei Malaria tertiana. [Clinical Experimental Investigations in Benign Tertian Malaria.]—*Arch f Schiff's u Trop Hyg* 1938 July Vol. 42 No 7 pp 287-305 With 4 figs [51 refs]

Unlike other acute infections benign tertian malaria does not cause salt retention and there is a parallel rise in sodium and chlorine output in some cases a histamine-refractory achylia was present as established by the examination of gastric juice. In achylia the resorption of vitamin C is disturbed small intestine flora (*Bact coli*) may be responsible. The author maintains that in acute infections vitamin C is used up more quickly than normally. Following intravenous administration of 300 mgm doses of ascorbic acid healthy individuals excreted about half this amount in 24 hours while patients with acute infection excreted only a small fraction of it. Where the liver was affected the results of estimation were not satisfactory. As in other infectious diseases the host in malaria uses greater quantities than normal of vitamin C. This substance plays a part in salt and iron metabolism, and in scurvy for example there is an iron deficiency. In benign tertian malaria the catalase index of the blood and serum albumin are increased while the serum globulin is decreased. All recent benign malaria infections gave rise to a positive Wassermann and lowering of plasmodial decomposition products in the blood. Flocculation tests (Kahn and Sachs-Georgi) were positive but haemolysis could not be demonstrated in the patients' blood the picture of which resembled that of pernicious anaemia with a hypochromic index. One thousand mgm doses of the vitamin given intravenously in malaria cases prevented rigors and gave a feeling of comparative well being urobilinogen in the urine was small in amount or absent and erythrocyte values remained practically unaltered. Anti-toxic and anti-haemolytic powers are ascribed to the substance. The view is put forward that haematin set free may act as activator of haemolysin. Since parasites flourished and fever was present but rigors absent during administration the author considers that temperature rise is due to parasite development and not to setting free of pigment—prevented by vitamin C—and that it is responsible for the rigors and haemolysis. Following cessation of treatment the haemoglobin value and erythrocyte count of the blood fell. The same agent caused a return of catalase index to normal and also of serum protein content. It caused the unspecific Wassermann reaction to become negative but did not affect the specific reaction it did however influence the above-mentioned flocculation reactions. The author discusses the application of vitamin C therapy in malaria and blackwater fever in conjunction with other remedies.

J D Fulton

## CHOLERA

PARIS. OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE. May Session 1933. Report of the Cholera Commission. [Mimeographed translation 5 pp.]

Many items of great importance are contained in this report. It is suggested by TAYLOR that the doubts previously expressed regarding the specificity of the O agglutination test may have been based on the fact that the vibrios isolated from certain cases of clinical cholera have been strains showing H agglutination only. This H element of the *V. cholerae* is also found in all types of water vibrio. It is once more affirmed that it is O agglutination which is all important for diagnosis of a cholericogenic rôle. In fact, evidence is forthcoming that no vibrios except those of the O Group No. 1 have been responsible for any concurrent or related series of cases in an outbreak of cholera. Such vibrios may be difficult to isolate as they are readily outgrown in culture by non-cholera vibrios. Of the haemolytic strains of vibrios it is more or less agreed that the designation *El Tor* should be restricted to those which give agglutination with an O Group No. 1 cholera serum and that they may have Inaba or Ogawa antigenic structure. A helpful and practical opinion however is that preventive measures on the occurrence of suspected cases of cholera should not await the isolation of a typical O agglutinable vibrio.

PETRAGNANI presented some data regarding four methods of preparing pure O cholera antigen with Inaba, Ogawa and Napoli strains. These were 0.5 per cent. lithium chloride, heating 0.01 per cent. phenol and 0.5 per cent. alcohol. The best of these was lithium chloride, as it seems to produce less denaturation of the antigen, which consequently produces a higher titre serum.

An important outbreak of clinical cholera in the Celebes Islands is described by DE VOGEL in which from no less than 47 cases with typical clinical symptoms a vibrio of *El Tor* type was isolated.

In spite of the betterment of methods of bacteriological diagnosis it is the considered opinion of the Commission that the practical criterion of cholera still remains the clinical one and that this should form the basis for administrative and prophylactic action.

H. F. Harvey

LEAGUE OF NATIONS HEALTH ORGANISATION EASTERN BUREAU SINGAPORE. ANNUAL REPORT FOR 1932 [PARK (C. L.) Director] — [Cholera pp. 50-87. With 4 maps & 26 graphs.]

*Cholera in Countries* — Under the heading of British India the first statement made is that there are certain provinces in British India which have been regarded as the home of cholera. [It is not clear from this introductory statement whether a share in the unenviable notoriety for being the "home" of cholera is now to be taken over by some other countries. Reference to the subject of homes of cholera is made later.]

Many graphs and useful maps give the chief incidence and mortality of cholera in British India, Burma, Siam and Indo-China.

*Cholera in Ports* — Notifications of cholera, and in some cases graphs of its course are recorded for Bombay, Tuticorm, Negapatam, Madras

Calcutta Chittagong Bassem Rangoon Bangkok Swatow Hoihow Canton Hongkong Macao Shanghai Hiroshima Okayama Haiphong and Macassar

*Seasonal Incidence*—Agreement seems to be general that epidemics of cholera are correlated with high relative humidity with high temperature accompanied by intermittent rain. A figure above 0.4 inch for absolute humidity is considered for India and other places to be the prerequisite of an outbreak of epidemic cholera.

*Direction and Mechanism of Spread*—Emphasis is laid on the fact that man himself is responsible for the spread of cholera. Religious centres of pilgrimage are not themselves homes of the disease but have the disease conveyed to them and dispersed from them by worshippers. Cholera spreads along the highways of human traffic. This traffic refers not merely to road and rail but equally to maritime traffic. An interesting regulation connected with the prevention of maritime transmission is that applied in some ports. All passengers leaving Hongkong and Haiphong were obliged to be inoculated and the same measure was applied as a routine to deck passengers from Swatow Hoihow and Bangkok.

In Japan much stress is laid on the possibility of spread of cholera by the pollution of sea water and the production thereby of direct or indirect infection. The vibrio is said to be capable of surviving in salt water for 47 days. Fish and shell fish may become infected and it is assumed that these, when eaten can cause infection. Points which are discussed in this report mostly in the form of references to work published on the subject, are the cholera carrier the antigenic structure of vibrios the El Tor vibrio and the introduction of clean water supplies.

IV F H

LEAGUE OF NATIONS HEALTH ORGANISATION EASTERN BUREAU  
SINGAPORE ANNUAL REPORT FOR 1937 [PARK (C. L.) Director]  
—[Plague and Cholera Cases in Eastern Ports, 1928-1937 pp 103-109]

These plague and cholera cases are given simply in the form of useful comparative tables of actual numbers for the several years 1926 to 1937

IV F H

HEGGS (T Barrett) Cholera in Iraq an Epidemiological Survey—  
Jl Egyptian Med Assoc 1938. May Vol. 21 No 5 pp 269-278. With 1 chart.

Seven years immunity from the visitation of cholera is for Iraq a noteworthy fact even if it is realized that the threat of this incursion remains always present. Although modern fast transport conditions have made the risk greater there is undoubtedly at the present time a much more efficient preventive service and control procedure than there used to be. Among the most important means of prevention are the supply of advance information from other countries of the existence of cholera and the compulsory inoculation imposed on Haj pilgrims.

The measures which are briefly considered by the author are those (1) concerning the entry of cholera into Iraq (2) concerning the spread of disease within Iraq and (3) concerning the spread of the disease out of Iraq. These are efficient and follow the usual lines of

receipt of epidemiological information prophylactic inoculation, and quarantine with inspection. The headquarters of the quarantine service of the port of Basrah has now been moved down to Fao where vessels may be medically inspected whether proceeding to Iraqi ports or to Basrah. It is however difficult to prevent entry of the disease from Iran across the Shatt-el-Arab. On the Najaf Medina authorized desert route to the Haj all pilgrims must possess a pilgrim sanitary pass granted only after medical examination must be inoculated against cholera and typhoid and must be vaccinated against smallpox.

Within the country itself much stress is laid on the correct recognition of first cases and the diagnosis is primarily based on clinical and epidemiological grounds. Preventive measures are taken on this basis with the addition of the presence of a vibrio and should be adopted without waiting for statutory agglutination tests. Inoculation of cholera vaccine is the sheet anchor of the preventive measures. It is intended also to use cholera phage in addition. Police control of population movement is not always easy to carry out but cordons are established to prevent smuggling of sick persons from infected to non-infected parts. It is not only the sick person, however but the carrier who is a difficulty in this connexion.

As regards the spread of the disease out of Iraq the brief statement here made is interesting. The presence of agglutinating vibrios discovered in the quarantine station of Syria from the stools of healthy travellers by the desert route from Iraq who had not been within 50 miles of an infected area must be considered a bacteriological anomaly the explanation of which is a mystery.

W. F. Harvey

VASSILIADIS (P. Ch.) [Docteur en Médecine] Étude sur la bactériologie des vibrions et l'épidémiologie du choléra. [Bacteriology and Epidemiology of Cholera.] [Thesis] [Catholic Univ. Louvain Faculty of Medicine]—120 pp. [Bibliography] 1937. Louvain: Imprimerie Pères des Sacrés Coeurs Mont Saint Antoine 9.

A monograph of 120 pages on the debatable subject of cholera may be expected to assemble most of the facts which are at present known. This thesis accomplishes that object clearly and in short compass. It would be too much to expect however that the debatable points raised could be settled in a work of this nature. The author admits that although "recently serological and chemical research has led to more rational classification" it has "not yet definitely solved the problem of the identification of the vibrios" causally concerned in the production of cholera. A series of twelve chapters with a bibliography and general conclusions make up the work.

In the historical chapter the milestones of cholera progress are set out as (1) the demonstration of the morphological and cultural characters of the new comma bacillus. Koch (1883-1884) maintained the specificity of the comma bacillus chiefly on its constant presence in cholera cases and on the fact that it had only been isolated in connexion with clinical cases of cholera. (2) the presentation by Finkler and Prior (1884) and Deneke (1885) of organisms from cases of *cholera nostras* and cheese respectively possessing the morphology of the cholera vibrio. (3) the addition by Bujwid and Dunham (1887) of the

cholera red reaction as a test for the cholera vibrio and the introduction of enrichment methods of culture by Dunham (1887) (4) the entrance of serological tests into the arena of differentiation with the test of vibriolysis *in vivo* of Pfeiffer and Isaacs (1884) followed closely by the application of the agglutination test to vibrios by Gruber and Durham (1896) (5) the first appearance on the scene of the agglutinable and haemolytic El Tor vibrio isolated from pilgrims laid by Arkwright (1920-1924) in the case of organisms of the coli typho-dysentery group of all cases of clinical cholera (6) the foundation of the same work smooth and rough variants and its application to cholera by Shousha (1924) with the serological and chemical extensions of the same work by Bruce White and Linton (7) the hopes raised of maternal progress in prophylaxis and therapy with the discovery by d Herelle of the anticholera bacteriophage

Personal study by the author contributes its own quota to the cholera problem and the material used for this consisted of 200 vibrios strains 100 of which were specially studied in regard to haemolytic character and their H and O agglutination powers. The O agglutination has special reference to the inclusion of agglutinable vibrios in the subgroup I of Gardner and Venkatraman. Special media used in the research of Inaba, Ogawa and Hikojima. Special media used in the research were those of Vedder and Van Dam an alkaline haemoglobin glycine agar and a special egg medium in which vibrios could be preserved for years

In the chapter on serological reactions considerable attention is paid to O and H agglutination of vibrios after being acted on by chloroform. This action in the case of O agglutination which is considerably reduced is regarded as due to the solution and removal of a lipid substance necessary for agglutination. Extraction by chloroform or ether on the other hand appears to accentuate the flagellar H agglutination of the cholera vibrio and to cause an H agglutination by anticholera sera to appear because he presents This is evidently a major finding for the author. This is the final résumé and the general conclusions as demonstrating a common parentage in all species of vibrios for the thermolabile H antigen.

Chapter I is devoted to the structure of the vibrio more especially chemical and antigenic structure and chapter VI to the distinctions between haemolysis haemodigestion and haemagglutination. Support is forthcoming for the Heiberg types of vibrio distinguished severally by their fermentations of mannose saccharose and arabinose.

On the subject of the identity of the El Tor vibrio with the true cholera vibrio we might have expected some degree of dogmatism from a worker in the laboratories of the Sanitary Maritime and Quarantine Service of Egypt. It is striking therefore to find the opinion expressed that up to the present all research on the nature of the El Tor vibrios far from solving the question have so complicated it that the position is one of great confusion. Our work on the summation of vibrios enables us to conclude that the haemolysis sometimes produced by cholera vibrio either spontaneously or under the influence of the anticholera bacteriophage although they are of the same nature as those of the El Tor vibrio are much more feeble in their action. Such difference of degree in haemolytic property is considered

sufficient to explain many of the epidemiological facts which combine to suggest that the El Tor vibrio is non-pathogenic.

The reader of this work will find it up to date and informative in what may be called the international cholera situation.

W F H

RAYNAL (J) & LIEOU (A) Sur l'épidémie de choléra de Changhaï en 1937 (concession française) [Cholera of 1937 in the French Concession of Shanghai].—*Bull Soc Path Exot* 1938 Mar 9 Vol 31 No 3 pp 201-205

Cholera, after an absence of five years made its appearance in Shanghai at the end of summer in 1937. Ordinarily cholera makes its appearance in the hot months of June and July and disappears by October or November. On this occasion the earlier months went by with no outbreak when suddenly at the end of August some 12 days after the beginning of Sino-Japanese hostilities, the first cases made their appearance. Whatever may have been the original focus of the cholera the chief cause of the explosive outbreak must be regarded as the incursion of war refugees. The rapid measures taken to place these refugees in camps, to attend to sanitation and to apply collective vaccination may be given the credit for the prevention of a more serious epidemic.

W F H

MALVAL (J) & PALUD (A) Le choléra de 1937 dans la concession française de Changhaï. [Cholera of 1937 in the French Concession of Shanghai].—*Bull Soc Path Exot* 1938 Mar 9 Vol 31 No 3 pp 205-212.

War conditions existed in Shanghai from 13th August to 11th November and with the panic that arose on the first of these dates there was a great incursion of Chinese into the French Concession. Seven cases of cholera were discovered on the 28th August and the number of cases rapidly increased. A total of 1 787 cases were recorded and the deaths were 347. The disappearance of the epidemic is ascribed to two factors one climatic and the other prophylactic. With the passing of the hot weather there was a drop of 10 degrees in the temperature between September and October while the coming of the rains washed everything to the river. The prophylactic measures which seem to have been the most efficacious were rapid segregation of refugees and anticholera vaccination.

W F H

TURNBULL (T A) Some Aspects of Cholera in Kongsun, South China.—*J Roy Nav Med Serv* 1938 Apr Vol 24 No 2 pp 138-142.

Epidemics in South China, which appear in the hot rainy months of August and September occur about every five years. It is noteworthy that the sampan and junk dwellers are usually those who are first attacked in the population. They use only river water for drinking and cooking purposes. The symptoms and course of the disease are familiar. In the stage of dehydration which results from diarrhoea and vomiting the body comes to be of bluish tinge and is very cold, yet the rectal temperature may be as high as 103°F. Among the diseases mentioned which may simulate cholera are bacillary

dyentery food poisoning and the algid form of subtertian malaria. Routine treatment consisted in administering first intravenously sod bicarbonate 160 grs sod chloride 60 grs water 1 pint in order to counteract acidosis. This was followed by intravenous hyper tonic salt solution—sod. chloride 120 grs calc chloride 4 grs pot chloride 6 grs water 1 pmt. Four pints of this solution at 104°F may be given in an hour and it may be repeated 2 or 3 times a day. During the flow of the fluid the pulse and blood pressure are watched and the administration is stopped when blood pressure comes back to normal and the pulse becomes full and bounding. The state of the pulse is the index for repetition of treatment and 1/50 gram atropine is given twice daily to prevent pulmonary oedema. Cases treated in hospital amounted to 400 to 500 and the deaths to 35 to 40

IV F H

QUÉNARDEL. Le choléra dans la province de Nam Dinh (septembre décembre 1937) [Cholera in the Province of Nam-Dinh.]—*Bull Soc Méd-Chirurg Indochine* 1937 Dec Vol 15 No 10 pp 1158-1166

The province of Nam Dinh in the north of French Indo-China is reached by river and road and is liable to the incursion of persons suffering from cholera. In the present outbreak which is traced to rich entry the figures given are—population 1,200,000 vaccinated 70,725 cholera cases between September and 1st December 512 which 92 had been vaccinated and 420 had not.

IV F H

ROUZIC. Note complémentaire sur le choléra à Karikal au cours des trois dernières années [Cholera in Karikal (Madras) in the Past Three Years.]—*Ann de Méd et de Pharm Colon* 1937 July-Aug-Sept Vol 35 No 3 pp 876-979

ATRAMAN (K V) & PANDIT (C G). An Epidemic of Cholera in a Rural Area in South India caused by the "Ogawa" Type of cholera.—*Indian J Med Res* 1938, Jan. Vol 25 No 3 585-589 [16 refs]

The Japanese work on vibrio types gave the impression that the original or Inaba type was associated with severe epidemic and the varied or Ogawa type with sporadic cases and a mild outbreak. In a severe epidemic of cholera in South India however the authors have proved that the vibrio concerned was the Ogawa type of Gardner and Venkatraman.

IV F H

BANERJEE (Kahgati). Unusual Complications in a Case of Cholera.—*Calcutta Med J* 1938, May Vol 33 No 5 pp 224-225

SHILLONG KING EDWARD VII MEMORIAL PASTEUR INSTITUTE AND MEDICAL RESEARCH INSTITUTE TWENTIETH ANNUAL REPORT FOR THE YEAR ENDING 31st DECEMBER 1936 [ANDERSON (L. A. P) Director] [Cholera pp 7-14]

As this report carries the work of the Pasteur Institute Shillong only up to the end of 1936 it has to be recognized that some of it is now past history



The laboratory was engaged on testing the value of standard sera prepared from dried  $O_{14}$  antigens under natural conditions of isolation of vibrios as requested by the Office Internationale d'Hygiène Publique. It was found that (1) In the presence of epidemic cholera typical agglutinable vibrios were isolated in a considerable proportion of cases during the acute stage provided sufficient colonies were examined. (2) In the absence of epidemic cholera a large number of cholera stools gave low agglutination with Inaba  $O_{14}$  serum but were agglutinable with H+O serum. In practically every case, however provided a large number of colonies was examined, at least one strain was also isolated which was typically agglutinable. (3) In certain undoubted cases of clinical cholera it seemed impossible to find agglutinable vibrios. (4) No typical agglutinators were isolated except from clinical cholera. (5) Every typical agglutinable strain belonged to Helberg's group 1 (mannose and saccharose positive arabinose negative). Most of the strains agglutinable to 50 per cent. of titre or over with H+O serum and some non agglutinating strains also belonged to this group. (6) The presence or absence of phage infecting the vibrios in nature did not appear to influence their agglutinability.

Comments and conclusions on the bacteriophage trial in Assam are depressing reading. The Director of the Institute states: "Had the use of bacteriophage been strictly confined to the experimental area we should, I believe, by now have reached a conclusive result. As it is it appears unlikely that we shall ever do so by an experiment on these lines in Assam. It is now too late to withdraw bacteriophage from the other districts."

IV F H

LEFEBVRE (M. A.) & GALLUT (J.) Sur l'emploi d'un milieu électif pour l'isolement du vibron cholérique. [A Selective Medium for the Isolation of the Cholera Vibrio.]—*Bull. Soc. Méd.-Chirurg. Indochine* 1937 Nov. Vol. 15 No. 9 pp. 1069-1079.

The selective medium used was a modification of that of Vedder and Van Dam. As it was found to keep for at least six months the hope is expressed that the medium could be sown direct from the case of cholera and despatched to the laboratory. By the time of its arrival the cholera colonies would have developed, would be recognizable and would be capable of subjection to immediate tests of identification. The medium is prepared as follows:—

(1) Prepare ordinary nutrient bouillon of pH 8. (2) Add 3 per cent. agar. (3) Sterilize 20 min. at 120°C. (4) Filter and add 40 cc. normal soda per litre. (5) Remove precipitate by filtration through cotton wool. (6) Distribute in large tubes in amounts of 14 cc. (7) Sterilize 15 min. at 115°C. (8) Prepare 10 per cent. solution of commercial crystalline haemoglobin in 10 per cent. soda 10 distilled water 90. (9) Prepare a buffer solution (pH 9.3) containing 8 ounces of sod. chloride & 850 glycine 7.505 and 2 volumes of decinormal soda. (10) Mix haemoglobin solution and buffer solution in the proportions respectively of 1 to 2.75 and sterilize for 20 minutes at 120°C. (11) Add 8 cc. of buffered haemoglobin to each 14 cc. of agar medium. (12) Slope. (13) Use immediately or preferably after drying for 24 hours in the incubator.

Colonies of cholera vibrios sown from a mixture of organisms appear 10 to 12 hours before the other organisms and present colonies of double the size.

IV F H

DOORENBOS (W.) *Vibrio-Problems In Epidemic and Endemic Cholera.*  
—// *Egyptian Med Assoc* 1938 May Vol. 21 No 5 pp 279-284

The problem of what is true cholera whether in an epidemiological, a clinical or a bacteriological sense is discussed in general terms in this article. Only one of the properties of the cholera organism remains uncontested that it is a Gram-negative vibrio. Clinically the disease may vary from a simple diarrhoea to the more typical and highly fatal disease with uniform diarrhoea vomiting cyanosis anuria cramps hypothermia and collapse. In some localities cholera remains endemic but at regular intervals becomes contagious and assumes epidemic form. The causative vibrios themselves isolated from actual cholera cases may either show well defined specific characters or may even in the single cholera case, show such great differences as to suggest that the vibrios isolated belong to many different species. Other points referred to are the SANARELLI phenomenon of association of other intestinal organisms with the cholera vibrio in the production of the classical cholera syndrome and the alteration of the vibrio in specific character through the action on it of cholera phage.

Doorenbos concludes that there are two main types of cholera, the epidemic and the endemic but that with all differences emphasized there remains still only one cholera vibrio "presenting itself in a more or less complete state or showing dissociation in its properties".

H F H

GENEVRAI (J) & BRUNEAU (J) *Caractères cultureux et biochimiques des souches de vibrios isolés au cours de l'épidémie de choléra du Tonkin. (1937-1938)* [Cultural and Biochemical Characters of Vibrios in the Cholera Epidemic of Tonking.]—C R Soc Biol 1938 Vol. 128 No 17 pp 278-280

Some 500 strains of vibrios have been carefully studied and appear to have shown uniform characters. The vibrio might be described as movement at first isolation, but after 3 or 4 cultivations in peptone water invariably acquired a disordered motility comparable to that of a flight of swallows. At the time of their isolation on nutrient agar the colonies were round of little height sharply contoured smooth and reached a diameter of 1 to 1.5 mm. in 24 hours. At this stage they were very transparent and of slightly bluish colouration by oblique light then then became slightly turbid, umbilicated and brown with age. Young cultures taken up in large quantity on a platinum loop appeared salmon pink. All the strains gave definite haemolysis on blood agar whether the blood was derived from sheep or rabbit. On the other hand no real haemolysis was obtained when washed sheep erythrocytes were added to a suspension of vibrios in normal salt solution but a violet colouration developed in 30 to 60 minutes and rather irregularly some superficial haemolysis after 24 hours at 37°C. Sugar reactions were studied by culture on litmus agar to which 1 per cent. of test carbohydrate was added. Glucose maltose saccharose and mannose cultures became red in 24 hours. Glycerin in 24 to 48 hours lactose and mannite in 2 to 4 days. Arabinose remained unchanged and all the reddened cultures became more or less blue.

again except glycerin. Lactose and mannite agar cultures often showed reduction in the lower part of the tube. Cultures on potato were scanty  
W F H

GENEVRA (J) & BRUNEAU (J) Résistance du vibron cholérique à l'action du sel [Resistance of the Cholera Vibrio to Salt].—C R. Soc Biol 1938 Vol 128 No 16. pp 146-148.

A question arose whether sea salt soiled with cholera during an epidemic could be the means of transport of vibrios from a contaminated region to a non-contaminated. All the evidence of viability of the vibrio in contact with salt was negative and hence no good reason appeared to exist for prohibition of transport of salt.

A further research into the possibility of growth of the cholera vibrio in media of different salinity gave these results (1) The vibrio cannot grow if the concentration of salt exceeds 8 per cent (2) The vibrio remains alive in salt concentrations of 9 per cent to 11 per cent. for 24-48 hours for 2 or more weeks at a concentration of 8 per cent. 3 weeks or more at 5 to 7 per cent and 4 weeks or more at 2.5 per cent  
W F H

GENEVRA (J) & BRUNEAU (J) Durée de conservation du vibron cholérique dans divers produits utilisés dans l'alimentation annamite [Preservation of the Cholera Vibrio in Annamite Food Stuffs].—C R Soc Biol 1938 Vol 128 No 16 pp 148-150. [Summary appears also in *Bulletin of Hygiene*.]

The food materials examined were "Nuoc Mam" (a preparation made with macerated fish) prawn pâté fermented soya sauce, soya milk, and soya cheese. Degree of salinity of these substances determined the length of life of the cholera vibrio. This was in fermented soya less than an hour prawn pâté 4 to 5 hours "nuoc-mam" 3 to 6 hours according to its content of total nitrogen. As these substances are always stocked for some time before being sold there can be no cholera danger attached to them. Soya milk and soya cheese on the other hand are consumed on the day of their preparation. As the viability of the cholera vibrio is assured in these for 12 hours they can be dangerous in epidemic periods.  
W F H

LINTON (R W) SEAL (S C) & MITRA (B N) Chemical and Serological Variation in Single-Cell Cultures of *Vibrio cholerae* and Related Organisms.—*Indian J Med Res* 1938. Jan. Vol. 25 No 3 pp 575-584

A transformation of a variant or strain into another variant or strain of organism is an important event and might even raise suspicions of the validity of criteria for specific differences. One of the stumbling blocks in any research of this kind is the uncertainty whether a given initial strain is really pure. This difficulty was surmounted by making use of single-cell cultures of vibrio strains "Rangoon Smooth,"

Rangoon Rough (2) and others each of which had its own set of characteristics. At the end of the experimentation a new strain had been produced having another set of biochemical, cultural and serological characteristics and a different chemical structure. This made of the new strain a different chemical group although it was found

to be still one of the groups within the framework of the two proteins and the three polysaccharides. The capacity therefore for trans-formation was still strictly limited IV F H

PANG (K H) Bacteriological Study of a Cholera-like *Vibrio* Isolated from Blood of a Patient.—*Chinese Med J* 1933 May Vol. 53 No 5 pp 450-454

In this study the author describes the characters of an actively motile Gram-negative organism with a single polar flagellum which had been isolated by blood culture from a debilitated patient along with *Bact coli* shortly before death. Antigenically this organism showed some degree of relationship to *V cholerae* IV F H

HISANO (Kanjii) On a Certain Cholera-like *Vibrio* suspected as the Cause of Diarrhoea.—*Jl Public Health Assoc Japan* 1933, Apr Vol. 14 No. 4 pp 1-2

An outbreak of nine cases of enteritis among the crew of a ship led to examination and the isolation of cholera like vibrios in pure culture. Not only were these vibrios inagglutinable by cholera sera but they were also divisible sharply into two groups which were entirely different from one another IV F H

LIEOU (Y) Sur un vibron cholérique isolé par inoculation au cobaye du contenu gastrique. [Isolation of a Cholera *Vibrio* by Inoculation of Gastric Contents in a Guinea-pig].—*Bull Soc Path Exot.* 1933 Mar 9 Vol. 31 No 3 pp 212-214

A patient aged 20 years who had partaken of French beans was taken 3 or 4 hours later with acute gastralgia and anuria. He had neither fever vomiting diarrhoea nor cramp in the limbs and the administration of an enema furnished a normal stool. Death took place within 24 hours of the commencement of the illness. The stomach contents were liquid yellowish green and slightly viscous. On analysis they showed neither alkaloids nor toxic metals. Inoculations with this fluid intraperitoneally in the mouse and subcutaneously in guinea-pig and rabbit gave a positive bacteriological result in the guinea-pig which died. The heart blood gave a culture in bouillon of an organism which was morphologically culturally and biochemically a cholera vibrio agglutinable at 1 in 1,500 and giving a typical peritonitis in the guinea-pig.

In his discussion the author notes that isolation was effected from gastric contents which are not ordinarily favourable to the life of the cholera vibrio but which may have been a reflux from the intestine. His conclusion is that the case was one of *cholera sicca*. Cholera was epidemic at the time IV F H

WHITE (P Bruce) The Rugose Variant of *Vibrios*.—*Jl Path & Bact* 1933 Jan. Vol. 46 No 1 pp 1-6 With 5 figs. on 1 plate [18 refs]

Wrinkled surface character of a colony used to be considered one of the distinguishing characters of organisms of R type. This character is however now much less differentiating between R and S types and the fact is emphasized in the present work where it is shown that

either R or S cholera vibrios may produce rugose colonies. Nevertheless the rugose variant had been taken to be "the extreme rough form of vibrio culture." The author makes examination of rugose derivatives from the strains of *V. cholerae* known as "Rangoon S" and "Rangoon rough 2." The rugosity of the colonies investigated is shown to be due to the fact that the cells are embedded in a glutinous intercellular substance or capsular material." Actual capsulation by mucoid substance was well shown in Rangoon rough 2 by means of "negative" staining with nigrosin. Rough culture is due, as shown by the author to failure to secrete or form the specific polysaccharide whereas it would seem that the rugose habit of growth is due to the very different property of zoogaea or capsule formation by "abnormally active secretion of mucinous material. Wrinkling of the surface of the colonies may be explainable by variation in degree of secretory activity in different regions of the growth. These rugose colonies perpetually revert to their normal S or R habit of proliferation.

W F H

LINTON (R W) SHRIVASTAVA (D L.) & SEAL (S C.) Studies on the Specific Polysaccharides of the Vibrios. Part I. The Effect of the Growth Medium.—*Indian J Med Res.* 1938. Jan. Vol. 25 No 3 pp 569-574

It had become evident in the course of the authors' studies that both the serological character and the quantity of a specific vibrio polysaccharide are profoundly affected by the medium in which growth takes place. Methods have been elaborated with the help of a standardized technique of evaluating this important influence. No drastic methods of heating or treatment with alkali or strong acid were used so that loss of activity and yield could not be ascribed to these. The presence of glucose in the medium and its fermentation with the production of organic acids was found to be the potent factor in bringing about changes in polysaccharides. It follows therefore that "unless conditions of growth are standardized, comparisons of polysaccharide yields and the reactivities of different strains are without much significance. The best standard medium to use is one of mutton infusion broth containing 1 per cent Merck's peptone with which a yield of polysaccharide of 16.4 mgm. per litre and "a reaction at a dilution of 1:16 000 000 could be obtained.

W F H

MITRA (B N) Proteins of Cholera Organisms and Related Species.—*J Trop Med & Hyg* 1938 Feb 1 Vol 41 No 3 pp. 37-40. [31 refs.]

A fairly detailed account is presented in this article of the methods which have been employed by LINTON and MITRA for the determination of "proteins I and II" of the cholera and cholera-like vibrios. These proteins cannot be identified as different by elementary analysis nor by the distribution of nitrogen. It has required the application of the method of racemization to effect the separation in the vibrio group of "at least two types of proteins which are structurally different." The theory of racemization may be more complex than originally postulated, if however in the procedure applied the results are constant then differences found by this method must be regarded as evidence of difference in structure of proteins in which no difference

can be detected by other methods The author seems to end on rather an uncertain note when he says It is impossible with the present data to say whether proteins I and II represent two different entities or whether they are mixtures of several proteins W F H

LAMB (F H) *The Cholera Epidemic in South China.*—*Jl Roy Nav Med Serv* 1938 Jan. Vol. 24 No 1 pp 64-66

In this communication some notes are given of a cholera epidemic in South China which was "more widespread and severe than any recorded in recent years. A standard treatment was used consisting of intravenous salt solution and kaolin by the mouth. The total quantity of kaolin for a patient was 1½ lb in a quart of water and it was administered in one ounce doses every fifteen minutes W F H

LAAME (M) *Le traitement du choléra par l'adrénaline.* *Treatment of Cholera by Adrenalin.*—*Rev Méd et Hyg Trop* 1937 Sept.-Oct. Vol. 29 No 5 pp 254-257

Treatment of cholera by adrenalin was instituted by the author as long ago as 1911. The basis of the treatment was the similarity which exists between the syndrome of cholera and hypoadrenism or suprarenal insufficiency. On analysis the cholera syndrome may be said to be vomiting sweating algidity cramps diarrhoea and arterial hypotension. These symptoms may be due to a selective action of the cholera toxin on the suprarenal glands. Suprarenal insufficiency renders the organisms sensitive to poisons and it is well known that in cholera it is inadvisable to use cocaine morphine etc although cholera patients are very tolerant of adrenalin. The suprarenals dead of a fatal dose of cholera toxin. In the treatment of cholera likewise are enlarged, hyperaemic and haemorrhagic in guinea-pigs subcutaneous doses of adrenalin have been used in doses of 4 to 6 mgm. every 24 hours for some days combined with injections of artificial serum if there is much dehydration W F H

BANERJEE (D N) *Anti-Cholera Measures in Egypt.*—*Calcutta Med Jl* 1938 Apr Vol. 33 No 4 pp 169-181

Two remarkable and instructive facts stand out with respect to cholera in Egypt. It took only 20 years after the discovery of the cholera vibrio to eradicate the disease and there has been no case of cholera in Egypt since 1902. These facts are all the more remarkable because of the continued existence of cholera in the near East and the constant menace of the Hejaz pilgrimage. They point to the efficiency of preventive measures and quarantine. The author gives in considerable detail the regulations regarding cholera adopted by the Egyptian Government W F H

MADRAS REPORT OF THE KING INSTITUTE OF PREVENTIVE MEDICINE  
GUTHRY FOR THE YEAR ENDING 30TH SEPTEMBER, 1936 [SHORT  
(H. E.) Director] [Cholera pp 21-22 23-30]

## PLAGUE.

LEAGUE OF NATIONS HEALTH ORGANISATION EASTERN BUREAU  
SINGAPORE ANNUAL REPORT FOR 1937 [PARK (C. L.) Director].  
—[Plague pp 24-50 With 13 graphs & 5 maps]

The main subdivisions of this report are (a) Plague in Rural Areas (b) Plague in Countries and (c) Plague in Ports

As regards rural areas it has been found necessary to draw attention to the need of control of the spread of plague by land traffic whether by rail or road. Such spread is attributed to transport of rats and their fleas independently of human cases of plague in grain, forage or other goods. The suggestion of plague transmission by rat immigration, as distinct from transportation is favoured by some authorities and denied by others. One interesting experiment in southern India, directed to determining whether bullock carts carrying rice might be the means of transport of the rats and their fleas proved entirely negative. In another investigation in Java it was decided that transportation of fleas did not play a major part in the spread of plague. Much work again has been done on the duration of infectivity of the starved flea. It seems to be clear that this is very variable and depends on climatic conditions.

In rural areas subject to plague visitation it is essential to organize a continuous plague control system. The report of an outbreak in British India brings into force certain measures (1) Vaccination (2) evacuation (3) rat destruction (4) disinfection and (5) "control of ingress and egress from infected areas including control of gram traffic." Under the head again, of general antiplague measures there are enumerated, with notes on each the following: ratproofing, rat eradication, general sanitation, vaccination, isolation and treatment of patients, regular collection and examination of fleas and last but by no means least, antiplague propaganda.

Under "Plague in Countries" a number of graphs of plague in British India and its provinces and some useful maps referring to plague in Fokien Province, Hainan Island, Manchuria and Java are given. The accompanying text amplifies these graphic representations.

Plague ports are dealt with in map No. 4 and by a suitable description. These ports are those of Karachi, Bombay, Colombo, Bassem, Rangoon in India and Burma and, with only one case, Phnompenh in Indo-China.

IV F H

UNITED STATES ANNUAL REPORT OF THE SURGEON GENERAL OF THE  
PUBLIC HEALTH SERVICE FOR THE FISCAL YEAR 1937 [PARKER  
(Thomas)] [Plague pp. 19-25.]

Plague infection is known to exist in seven Western States but has not been discovered east of Wyoming nor south of Utah except in California. Nevertheless reports are being received of numerous deaths among rodents from other areas and these are being investigated. "The most northern point in the United States in which plague infection has been discovered is about 150 miles from the Canadian border." Ground squirrels found to harbour plague now number seven species an addition of three new species—*Citellus beecheyi*, *C. fisheri*, *C. grammurus* and *C. townsendi*. Other wild rodents from which

infected fleas have been collected include a tree squirrel (*Sciurus douglasii albolimbatus*) chipmunks (*Eutamias* sp.) marmots (*Marmota flaviventris nosophora* and *M. flaviventris engelhardti*) and prairie dogs (*Cynomys ludovicianus*). These are all new plague rodents. All four cases of human plague during the year recovered.

The facilities of the Public Health Service Laboratory in San Francisco have been made available to all of the States. Mobile laboratories are provided for field work.

Flea investigation has shown that *Xenopsylla cheopis* is a more ready transmitter of plague than other rodent fleas. It is obviously important to know what is the relative importance of different species of fleas as it may thus "be possible to determine the regions of the United States that will eventually be foci of wild rodent plague and also have a better idea of what measures should be used for controlling the epizootics."

W F H

ALFARO (Araoz) La notable décroissance de la peste dans la République Argentine. [Marked Decrease of Plague in the Argentine]—*Bull Office Internat d'Hyg Publique* 1937 Dec Vol 29 No 12 pp 2516-2517

Anti-plague measures in the Argentine are attended with great difficulties owing to the great area of the country in proportion to its population, the great production of cereals and the transport of the cereal crop by road, rail and river. Nevertheless the restricted efforts of the sanitary authorities have been followed by a noteworthy decrease of plague. Already human cases are very rare for a country of 3 000 000 square kilometres and more than 12 000 000 inhabitants. Anti-plague measures instituted by Act of Parliament have steadily been extended from the large ports and large towns to all the railways and to the small ports. Figures for cases of plague in the years 1919 to 1924 are 1 178 1 105 195 78 90 and 31 respectively while the figures for the years 1931 to 1936 are 62, 129 67 45 15 and 31 respectively. Buenos Aires with more than 2 200 000 inhabitants and a large port has not recorded a single case of plague from 1931 to 1936.

W F H

ALBORNOS (Francisco) Epidemiología y desarrollo de la peste bubónica en Rosario. [Epidemiology and Development of Plague in Rosario]—*Bolet Sanitario* Buenos Aires 1938 Jan. Vol 2 No 1 pp 4-25. With 6 diagrams & 3 charts

Plague made its appearance at the port of Rosario in the Argentine Republic from Asunción, Paraguay in 1899. It spread thence through the country. A study is made by the author of the features of bubonic plague for the 38 years 1900 to 1937. During this time there were 703 cases of human plague in Rosario. Some of the figures of this period are interesting—a mean mortality of 35.27 per cent. 110 483 rats killed per year and an export of maize and wheat amounting to 6 740 000 tons. The period may be divided into four decades the fourth one an incomplete one of 8 years. In the first decade from 1900 to 1909 there was confusion and disorientation. It was the decade of sanitary expectation. Then came the decade of some activity in the struggle against plague—some deratization and some domiciliary disinfection. The third period may be said to be that of



disinfection and antiplague vaccination. These do not seem to have had much effect upon the progress of the disease. In the fourth decade measures of active deratization and rigorous sanitation were adopted with highly satisfactory results.

A very good index of the efficacy of antiplague measures in these several periods is afforded by the number of cases of plague that have occurred—from 1900 to 1909 257 cases 1910 to 1919 225 cases from 1920 to 1929 207 cases and from 1930 to 1937 only 14 cases.

IV F H

ROSIER (H J) *Verlag betreffende de pestbestrijding op Java over het jaar 1935* [Report on the Plague Campaign in Java for 1935.]—*Meded. Dienst d Volksgezondheid in Nederl Indië* 1937 Vol. 28. Supplement pp 1-100 With 17 graphs & 10 maps. English summary

The summary to this report gives all essential details —

In 1935 plague in Java showed considerable decrease for the total incidence of 13 022 cases with 12,993 deaths compared favourably with 1934 the peak year of Java, in which 23,267 cases and 23,239 deaths occurred. A notably different distribution of deaths prevailed in different parts of the island—W Java 10,307 deaths mid Java 2,687 and E. Java 1. The extent of the epidemic remained unaltered except for the yearly reduction which as usual went with the continued house improvement campaign. Epidemic plague is still essentially bubonic but pneumonia is a common complication and there were 1,506 cases of primary pneumonia which were spread more or less uniformly among the bubonic cases. Spleen puncture proved a very satisfactory post-mortem procedure in the establishment of a certain diagnosis and was not opposed by the native population. In 1935 antiplague inoculation was adopted on a large scale for the first time and the avirulent live vaccine of OTTEN was used. This was commenced on 23rd January in the affected areas and 2,363,642 inoculations were carried out of which 212,137 were reinoculations. Vaccination was not compulsory but was well received to the extent of 90 per cent. of the population, for it is almost without any reaction. No accidents of any sort occurred and no difficulty was experienced in transporting vaccine even to remote districts. Excellent results were obtained, and "considerable reduction in deaths from plague rapidly manifested itself wherever inoculations had been made. The present decline of the epidemic is attributed chiefly to the prophylactic value of Otten's vaccine. Vaccination, however is not intended to replace the policy of house improvement which is regarded as the more permanent measure and which is being continued on the same scale as usual. The total of houses improved in 1935 was 36,572 and the total since introduction of the method was 1,383,363. In all the improved areas supervision is maintained of the building of new houses.

IV F H

BARUTOLAND ANNUAL MEDICAL AND SANITARY REPORT 1936  
[DYKE (H W) P M O] [Plague pp 8-9]

In the Mafeteng district between 24th December 1935 and the end of February 1936 sixteen cases of a disease without buboes and resembling Typhus Fever occurred in a group of small villages and

one case in a village 20 miles away. All of these patients died. No dead rodents were found at the time and the picture was further obscured by the activity manifest among the gerbilles. None the less complete deverminization of the villages was carried out but the disease broke out again four weeks after the first outbreak. There were still no glandular enlargements but blood culture revealed *P. pestis* which left no doubt about the diagnosis. Very thorough measures of quarantine deverminization destruction of fleas and vaccination of contacts were carried out and no more cases occurred. A rodent survey now revealed that widespread mortality had been taking place in the district for two or three months. It was found that 60 to 70 per cent. of burrows were silent but whether this desertion of burrows was due to plague or to poisoning could not be determined. When, however investigation showed that activity had almost entirely ceased "in areas where poisoned wheat had not been used it became certain that an epidemic among gerbilles was rapidly spreading northwards. This seems not to have been altogether undesirable for the gerbilles had in previous years seriously damaged crops. The gerbille life was almost entirely wiped out throughout the territory by March. By August however they were breeding rapidly again. A campaign against this rodent in which agricultural and medical departments co-operated, was initiated. The plan was to bait every gerbille burrow over an area of country 150 miles long by 6 to 10 miles wide. European officials directed operations and native men and women were organized into regiments for the work. On an average a regiment of 250 persons could cover 12 square miles in a day baiting every burrow hole which in places would be several hundred to the acre. The drive was successful and by November the gerbilles had been practically wiped out and the double effect achieved of plague prevention and foodstuff protection. All that remains is for the chiefs and people to carry on the good work.

In the mountainous parts of Basutoland at 6 500 ft. the common rodent is the mountain Berg rat *Olomys* (or *Myotomys*) *robertsi*. No mortality was discovered among these rodents which do not enter human habitations nor were any fleas seen on them. W F H

CAMPBELL (J McPhail) An Outbreak of Plague in Mwanza, February to June, 1937 — *Jl Trop Med & Hyg* 1938 May 16 Vol 41 No 10 pp 157-168 With 3 charts

JOURNAL OF TROPICAL MEDICINE AND HYGIENE 1938 May 16 Vol 41 No 10 pp 171-174 — Plague a Brief Consideration of its Prevalence and Control in the Twentieth Century

A fresh outbreak of plague in a small town, where relevant factors can all be taken into consideration and severally examined is instructive for all medical officers likely to be faced with such an emergency problem. Mwanza with an altitude of 3 709 feet is situated on Lake Victoria in Central Africa and has connexions by road, rail dhow and steamer with other places. Its trade is in rice hides grain and cotton. One of the important questions regarding the present epidemic has reference to the introduction of the disease by unpressed hides known to be carriers of fleas pressed baled hides baled cotton lint cotton seed and gram are excluded from this possibility and, although rats do nest in seed cotton, this was not a source of infection in the present instance. Medical

examination of crews and passengers had been abolished but in view of the fact that the rough test here instituted of gland palpation and temperature taking served to discover three cases of ambulatory plague, it is recommended that the original medical examination should be made compulsory.

A regular routine was adopted for plague workers entering infected houses. Thus they did behind an anti-flea emulsion barrage and the arms and legs of the workers were also sprayed. Overalls and knee boots are not very favourably regarded as preventives of flea infection and are likely to make the worker neglect other precautions. One of the most effective measures adopted, especially by the Indian population, was to block up all rat holes in their houses and for the inhabitants to close themselves in their houses in a self-imposed curfew order at dusk. Trapping was energetically carried out and was most effective with the break back type of trap but the author's own view is that antirrat measures which would include trapping, poison baiting (barium carbonate 1 maize meal 3 and a little oil) and gassing (1 lb cyanogas dust per 6 000 cu. ft.) are better carried out during the plague off-season than during the actual epidemic, because this kills off the important rat-cause of carry-over of plague to the next season. He has little belief in a carry-over by free bacilli in dust or fomites or by survival of unfed "blocked" fleas. The climatic conditions in the present epidemic were of a favourable type, especially as regards relative humidity. This fact is brought out in the statement "Plague started after the relative humidity had been steadily above 80 per cent for 20 days. It continued for 12 weeks during which the relative humidity remained above 80 per cent. and it ceased 14 days after the relative humidity dropped below 80 per cent." Mass inoculation was adopted but did not seem to have any effect in stopping the outbreak, modifying the illness or reducing the chances of acquiring infection. It had the psychological effect of allaying panic.

W F H

GEORGE (M.) Investigation of Alleged Outbreak of Human Plague (15 Cases) at Khudis—*Backwashaland Protectorate Ann Med & San Rep for Year 1933* Appendix D pp 42-43

HOPKINS (G H E.) Cotton and Plague in Uganda. With an Appendix on Post Mortem Examinations of Rats used in the Experiments by R S F HENNESSEY—*Jl Hygiene* 1933 Mar Vol. 33 No. 2 pp. 233-247 [10 refs.]

A definite denial is made in this publication that the cotton industry as carried out in Uganda has any special correlation with plague. The reverse view has been asserted by various authors and their statements are summed up by THORNTON (this *Bulletin* 1931 Vol. 28 p 339) in the sentence which is quoted here— "As at present conducted the industry is a peril to other countries and to the peasants of Uganda themselves on account of plague." This indictment has already been dealt with by ROBERTS (this *Bulletin* 1933 Vol. 33 p 359) and refuted. A further refutation is now given with statistical support to show that so far as the data of cotton production and plague go "there is actually a negative correlation ( $-0.4682$   $P < 0.02$ ) between the two sets of figures." The author's conclusions, abbreviated, are—(1) Statements as to the existence of a special correlation between

the cotton crop and plague in Uganda appear to be unsupported by evidence. (2) In Uganda rats utilise raw cotton very extensively for nesting material and the seed is habitually eaten. (3) Fleas sometimes breed freely in cotton seed but only when it is old and partly reduced to dust by insects. (4) The observations do not support statements that rats are more prevalent in buildings associated with the cotton trade than elsewhere but there does seem to be a higher average flea population per rat in the case of rats captured in gummies than in that of rats caught in similar buildings not connected with the cotton trade. (5) The evidence shows that rats and fleas are not carried in baled lint. They are sometimes carried among bags of cotton seed, but only in negligible numbers. (6) The case against the cotton trade in Uganda as a special agency in the dissemination of plague is not proved and is probably false. Such danger as there may be is a local problem.

W F H

FOURIE (L.) The Endemic Focus of Plague.—*South African Med J*  
1938 May 28 Vol 12 No 10 pp 352-357 '13 refs.'

New problems have arisen in connexion with campaigns against plague since it was realized that epizootics and enzootics among the rodents of the field must be reckoned with as well as those among the domestic rat population. The South African Union provides a notable example of this and the problem is being actively dealt with by the authorities. Human outbreaks of plague began in South Africa at the time of the Boer War but were confined to seaports and the railroads up to 1914. That year ushered in, with a virulent outbreak of pneumonic plague on an isolated farm, "the beginning of the period during which the disease has been essentially rural in its distribution." Plague is now endemic over the Union and over a vast area to the Zambesi and Okavango rivers. Two groups of wild rodents are responsible for this state of affairs the gerbille (*Taterus* and *Desmodillus*) and the multimammate mouse (*Mastomys natalensis*). Gerbilles do not come into close contact with man, they are very shy animals. It is the multimammate mouse which is the intermediary by occupying flea infested nests of burrows in which gerbilles have died out. They also infest homes and out buildings of human beings and represent indeed the domestic rodent of native communities. Human outbreaks in the veld have therefore been limited to the range of this rodent. The gerbille however is the main reservoir of the rural orylvatic plague of South Africa and the territories beyond. It is interesting to note that another member of the gerbille family, *Lerone meridarius* is the reservoir of plague in the steppes of S.E. Russia.

As regards fleas associated with the spread of plague in South Africa account has to be taken of the species concerned in the spread of plague among wild rodents and of those associated with the disease in domestic rodents. Primary epizootics would seem to be spread by three fleas *Desmodillus* *lypax*, *Xenopsylla eridani* and *Christopsylla rossi* while *X. brasiliensis* met with on multimammate mice and domestic rats has probably been the transmitter of bubonic plague from rodent to man.

So far as towns are concerned it is the domestic rat which is the real danger and as there is strong natural antagonism between these and wild rodents there is no direct contact between them. For this reason

[October 1937]

the author is of the opinion that the elimination of rat harbourages in and around towns is of much greater importance than measures against wild rodents. "In the campaign against rats gassing with cyanogas should take the place of poison. The harbourages should always be gassed before they are eliminated by rat proofing."

W F H

KAMAL (A. M.) An Epidemic of Pneumonic Plague at Mallawi.—  
*Jl Egyptian Public Health Assoc* 1937 Oct. 12th Year  
 pp 1-11

The origin of the epidemic is traced to the return of a patient with bubonic plague to his native village in order to die amongst his family. He was a diabetic and developed secondary plague pneumonia. From this source a family epidemic originated. In a country like Egypt where villages are very scattered and medical arrangements difficult it is interesting to learn how the presence of epidemics is disclosed. Deaths are certified by a Health Agent who resides in each village and are notified by telephone to the Medical Officer of Health. If the monthly death rate does not exceed 3 per thousand it is taken to be "normal." If this limit is exceeded in the village or if more than one death occur in the same family within eight weeks the presence of infectious disease is suspected and bodies must be kept for the M.O.H. whose permission has to be obtained for burial. If he suspects "acute disease" a definite procedure is carried out of puncture with a 5 cc. syringe of the heart apex and base of lungs and liver to make the necessary agar cultures and smears and to fill capillary tubes. These are despatched to the district bacteriologist for examination.

W F H

KAMAL (A. M.) assisted by M. ISMAIL & A. H. SAMAAH On the  
 Epidemiology of Plague in Assiut Province with Special Reference  
 to the 1937 Epidemic.—*Jl Egyptian Public Health Assoc* 1937  
 Nov 12th Year pp 1-34 With 8 charts.

The epidemic referred to in this communication actually occurred in Kousaieh a district of the province of Assiut which is the most important province of Upper Egypt. Climatically there are three regions in Egypt the Southern ranging from Assiut to Mediterranean in character the Northern from Cairo to Assiut Wadi Halfa which is hot and dry but tempered by the prevailing wind from the north, and the intermediate portion from Cairo to Assiut. Plague has a maximum prevalence for the northern region in June and July for the Southern region in March and April, and for the mid region in May. Villages in Egypt are scattered units the houses in which are mainly built of sun-dried bricks. An important feature of the house from a plague point of view is the roof, consisting of sheets of matting, sticks and stems laid across split palm tree trunks with the hollows filled in with earth. There is a further covering of mud or mud bricks on this foundation. Abundant opportunity for nesting is afforded to rats in this type of roof. In Egypt there is little reason to doubt the connexion of rat epizootics with epidemics but it is difficult to obtain evidence on the spot of the occurrence of dead rats. Plague in Assiut province is endemic but reached epidemic proportions in 1936-37 when the number of cases showed a percentage of 85.8

compared with all Egypt whereas the percentage, taken over the series of years 1906 to 1937 was only 18.55. A number of maps and detailed tables accompany this article. One of the conclusions reached regarding plague prevention is that nothing short of demolition of the mud houses of the inhabitants and the building of rat proof habitations will keep the plague away.

CUMMING (Hugh S) Peste humaine et peste chez les rongeurs sauvages aux États-Unis dans l'année 1936-1937 [Human and Wild-Rodent Plague in the U.S.A. 1936-37]—*Bull. Office Internat. d'Hyg. Publique* 1937 Dec Vol. 29 No 12. pp 2518-2521

There were five cases of human plague in the United States in the fiscal year 1937 three in California one in Utah and one in Nevada. During this year 105 cases of plague were found in the rodents of these regions—*Citellus beecheyi* (squirrel) etc *Eutamias* (chipmunk) marmots (first recorded cases) *Cynomys parvidens* (prairie dog first case) and rats. No human cases occurred in Hawaii but 103 plague-infected rats were discovered.

PUBLIC HEALTH REPORTS 1938. Apr. 22. Vol. 53 No 16 p 638—Plague Infection in Adams and Lincoln Counties, Wash. The plague infection was detected by mass inoculation of two lots of fleas one of 252 from 24 ground squirrels (*Citellus townsendi*) and the other of 94 from 11 squirrels.

OHROMO (T) KOGA (S) & TANAKA (I) Rats in the Kobe Customs Sheds and the Fleas found on those Rats.—*Jl. Public Health Assoc. Japan* 1937 Oct pp 1-6

Rat surveys in Japan have shown that the distribution of the various species of rats in ships is considerably different from that on the shore. The opportunity occurred of investigating the rat population of the Kobe Customs jetty and warehouses which constitute practically a mid way zone between ships and shore. Of 482 rats examined from this source *Rattus rattus alexandrinus* were much the most common (71.57 per cent) *Rattus norvegicus* were 11.2 per cent. *Rattus rattus rattus* 9.85 per cent and *Mus molossinus* 7.26 per cent. In both Tokyo and Kobe cities it has been shown that *Rattus norvegicus* is most numerous followed by *alexandrinus* and *rattus*. In ships *alexandrinus* are most common and *rattus* next while *norvegicus* are very few. The proportions on the Customs jetty suggest that the rat population is derived as to 70 per cent from ships and 30 per cent from the shore.

A flea-count was carried out on 156 rats caught alive. Forty-six rats (29.5 per cent) were free of fleas. From the remaining 110 rats (70.5 per cent) 878 fleas were obtained. Of these 878 fleas 684 (75.62 per cent) were *Xenopsylla cheopis* and 185 (21.07 per cent) *Nosopsyllus fasciatus*. The remainder were *Nosopsyllus anisus* 12 (13.6 per cent.) *Echidnophaga gallinacea* 12 (13.6 per cent) and *Leptopsylla musculi* 5 (0.56 per cent).

In flea counts of rats caught in Tokyo city only .01 per cent. and in Kobe city (an open port for foreign trade) 5.73 per cent. were *Xenopsylla cheopis*.

The fact that the Cheopis index for the Customs compound is 4.2 deserves serious attention from the point of view of plague protection.

Chas. F. White

PHILIP (Neal) Un exemple de propagation de peste avec contagion féline possible. [Possible Feline Plague.]—*Rev Méd et Hyg Trop* 1938. Jan.-Feb. Vol. 30 No. 1 pp. 40-41

In the province of Kampu in Cambodia cats were kept by the inhabitants as a check on the invasion of houses at certain seasons by rats. As a considerable mortality occurred among the cats at the same time as an epizootic of plague in rats it is assumed that this was due to feline plague.

W. F. H.

ESKEY (C. R.) Recent Developments in our Knowledge of Plague Transmission.—*Public Health Rep* 1938. Jan. 14 Vol. 53. No. 2. pp. 49-57

An experimental study has been begun in the Public Health Service Laboratory in San Francisco which has as its object the determination of the ease of infection of fleas of rats and wild rodents, and their relative powers of transmission of plague. Of all the fleas tested, *Xenopsylla cheopis* contracted plague infection much the most easily the proportion being 55 per cent. for *cheopis* and only 21 per cent. for all the other fleas. Four species *Nosopsyllus fasciatus* from rats, *Diamanus montanus* and *Hoplopyllus anomalus* from Californian ground squirrels and fleas from desert antelope ground squirrels, all showed approximately the same degree of susceptibility to plague infection, as about 25 per cent. of them harboured virulent organisms. Other fleas than these showed much less infection.

The experiments on transmission of plague by infected fleas also showed marked differences among the different species in which infection by *cheopis* was much more effective than by *Nosopsyllus fasciatus*, *Diamanus montanus* and *Hoplopyllus anomalus*. Precise data on this point cannot yet be given as the numbers used are not sufficient to justify definite conclusions. Another point which appears important is the blockage of the oesophagus in the flea, by multiplication of plague bacilli in the proventriculus. Infected fleas which do not show evidence of blockage do not seem to be infective so far as their bites are concerned. It would seem also that the bites of most infected fleas are infectious for a very short time, probably not more than 1 or 2 days. Nevertheless the fleas themselves may be plague-infected and, with the exception of *cheopis* which had an average life of only 18 days, remain alive for months. This fact may explain the possibility of carriage of infection through months during which rodents are hibernating. Virulent plague bacteria may be found in the faeces of infected fleas and although it is considered doubtful whether man is commonly infected by rubbing of faeces into the skin at the site of flea bites it may be otherwise with natural rodent hosts. In fact it is difficult to understand how it is possible for such rodents to escape infection from infected fleas. So far as the present studies have gone it would appear that when the plague bacillus once becomes

established in the gastro-intestinal tract of a flea it continues to exist there until the death of the flea.

Observations are offered regarding the dissemination of sylvatic epizootics in the United States and the facts seem to warrant the conclusion that the parasites involved are rather inefficient vectors as compared with those responsible for domestic rat epizootics and the associated human epidemics.

W F H

SAUTET (Jacques) Étude critique du rôle de divers arthropodes dans la transmission de la peste. [Various Arthropods in the Transmission of Plague.]—Arch Méd Gén Colon 1938. Vol. 7 No 2. pp 42-49

In this essay on the vector relationship of arthropods to plague a number of more or less recent observations are collected. As might be expected the major rôle is accorded to the flea. It is pointed out however that the relationship is not simple but complex and dependent on a number of still unknown factors. Some of the factors have been worked out and are set out in this communication seriatim—

(I) The causes which determine the proliferation or the destruction of fleas. These are (a) Seasons mostly a matter of the hot season and the activity of fleas at this time. (b) Humidity an important factor varying with the flea species involved. Thus *Pygiopsylla ahalae* common and dangerous in China, Sumatra and Japan requires for its development a high humidity. *Synosternus pallidus* on the other hand the flea of Senegal, requires the dryness of the sandy desert. (c) Nourishment. It is the food of the larvae which is all important but in some cases this is dependent on the dejections of the parent. *Nosopsyllus fasciatus* for example feed on the dejections of the parent. (d) Temperature. This may be affected by the season or by altitude. Such flea species as live in deep burrows are not subjected to much variation in temperature and may continue to multiply all the year round.

(II) The causes influencing the duration of life of fleas are much the same as those concerned with proliferation, although they may act in an adverse way. Thus multiplication may diminish with the lowering of the temperature while the longevity of the flea may increase.

Other causes passed in review are those of (III) the dispersal of fleas and (IV) the degree of infection of fleas and its persistence. An explanation has been given of the transmissibility of infection by fleas—fleas that are completely blocked die those that are incompletely blocked can live for a long time and are eminently dangerous (*Xenopsylla cheopis*) those that are not blocked are not a source of much danger.

Other arthropods such as bugs, lice, and ticks receive some notice.

W F H

MERTENS (W. K.) Kan *Triatoma rubrofasciata* (de Geer) pest over brengen? [Can *T. rubrofasciata* (de Geer) transmit Plague?]—Meded Dierst d Volksgezondheid in Nederl Indië 1938. Vol. 27 No 1-2. pp 171-176 English summary

1 *Triatoma rubrofasciata* (DE GEER) may harbour plague bacteria for at least a month, provided no meals are taken meanwhile containing blood from healthy cavies.



"2. The above mentioned triatome may therefore act as a virus container whereas the plague infection may be transmitted by means of a sting from one triatome to another. It is, however doubtful whether this is of frequent occurrence in nature.

"3. Exceptionally the rat might be infected by eating infected triatomas.

"4. The plague infection is transmitted neither to the eggs nor to the progeniture of the triatomas.

5. Plague infection is not transmitted by this triatome to other animals by means of a sting unless this should take place immediately after an interrupted meal, on a plague infected animal.

6. In the faeces of plague infected triatomas no plague bacteria could be shown.

7. These triatomas mean no danger of plague infection for man unless an infected triatome is smashed on the body and the plague infected blood is rubbed into the channel made by the sting.

PETRAGNANI (G) Le diagnostic de la peste chez les rats. [The Diagnosis of Plague in Rats.]—*Bull. Office Internat d'Hyg Publique* 1937 Dec Vol 29 No 12 pp. 2522-2525.

All rats showing at autopsy indication of inflammatory lesions are subjected to further examination. In the first place smears are made from the spleen and stained with methylene blue of the following composition: 10 cc. distilled water 2-3 drops cold-saturated methylene blue 12 drops 1-1000 lactic acid. Staining for 30 minutes with slight heat will bring out perfectly the bi-polar colouration of the short bacilli. A small fragment of spleen is then agitated in a little nutrient bouillon and a loopful sown for separate colonies on agar. Discrete colonies are identified as usual. If putrefaction, however, has set in before the rat comes to autopsy it is better to use bone marrow and still better to use brain material in a medium of 8 parts ordinary bouillon and 2 parts liver bouillon. Among the means of identification are: (1) Polymorphism of the plague bacilli and development in culture at low temperature (10°C). (2) Non-development on sterilized reconstituted (water) old cultures of plague in contrast to other organisms. (3) Nitrous acid reaction with sulphathiazole and naphthylamine which is positive for plague bacilli but negative for other organisms except cholera. (4) Deposition of a loopful of test material in the inner canthus of the guinea-pig's eye with production by the 5th or 6th day of fatal plague septicaemia and a contraction of the muscles of the neck on the opposite side, if the material is virulent.

An interesting example of local immunization can be demonstrated by means of this last technique. Avirulent plague bacilli are instilled into one eye of a guinea-pig, when the animal will be found some weeks later to tolerate the instillation of virulent plague bacilli into that eye but to die of plague just like a control animal from instillation of virulent bacilli into the other eye.

IV F H

NAZARETH (F V de Sequeira) A peste das crocoduras [Plague and Musk Rats.]—*Bol. Geral Med e Farm* 1938. Jan. & Feb. Ser 20 Nos 1 & 2 pp 38-51.

The musk rat must be considered as a carrier of plague fleas and plague bacilli and as being itself susceptible to plague.

IV F H

CARMAN (John A.) *Prontosil in the Treatment of Oriental Plague—East African Med JI* 1938 Feb Vol. 14 No 11 pp 362-366

Prontosil treatment of plague in 1937 was started with the tenth case admitted to hospital. All the previous nine cases had died. Of the six cases which have so far been treated with prontosil three have recovered. The injections were intramuscular morning and evening and the dosage 5 cc or 2½ cc. The results obtained encourage the continuance of the treatment. B F H

PIRIE (J H Harvey) & GRASSET (E) *Plague. Killed versus Live Organisms for Protective Immunization and for the Preparation of Curative Serum.—South African Med JI* 1938 Apr 23 Vol. 12, No 8 pp 294-296

Experimental work on rats is set out here with reference to the relative merits of killed and living vaccines and of the anti-serum prepared by immunizing horses with killed and living organisms respectively. In the case of the vaccines the results are striking. None of the vaccinated animals tested with 2 4 8 16 and 32 M.L.D respectively survived when the killed vaccine had been used previously whereas all of them survived in the living vaccine series. A similar result emerged when serum prepared with the two types of organism was used. Killed-organism serum saved none of the six rats tested while living-organism serum saved two out of the six. Some experimentation in the concentration of anti-serum gave better results for a 1-process method than for a 2 process method (2 fractional precipitations) and has led to the former being adopted as the standard. W F H

OTTEN (L.) *Immunization against Plague with Dead and Live Vaccine.—Meded Dissert d Volksgezondheid in Nederl Indië* 1938. Vol. 27 No 1-2. pp 111-123 With 1 chart [10 refs.]

Otten's work on immunization against plague by means of his living avirulent strain Tjiwidej is well known both on the experimental side where he used the very sensitive guinea pig as his test animal and on the practical side where he has made one of the few trials in the field of his vaccine by a genuinely attempted alternate-case method. His results in the field therefore have statistical significance. The graph which prefaces this article shows the drop in the mortality of plague during the years 1935-37 when live vaccination was started and used as contrasted with the years 1932 to 1934 is very striking. He is convinced that the combating of a plague epidemic by means of vaccination can be successful only by the use of a live vaccine prepared from avirulent strains of high antigenic potency. The recent Conference on Rural Hygiene of the League of Nations at Bandoeng seems to have been unable to endorse this conviction, striving—according to Otten—mainly for a compromise opinion. Much support and for careful standardization of dosage by the Haffkine Institute in Bombay. This work has been carried out with great care and elaboration in mice and much of the present article is a closely reasoned attempt to find the weak points if any in the experimentation.

KARIADI Oriëntceerend filariaonderzoek te Martapoera (Rea. Z/O Afd. v. Borneo) [Filariaals in Martapoera (Borneo).]—*Genesck. Tijdschr. v. Nederl. Indië* 1933. May 10 Vol. 78 No. 18 pp. 1127-1133. With 2 figs. English summary

Martapoera is situated on the river of the same name and is surrounded by marsh during the rains. The main groups of mosquitoes prevalent in the area are *Mansonia annulifera* and *Mansonia uniformis*. Infective indices for filaria were found, for mosquitoes caught in houses as high as 22 per cent in *M. annulifera* and 8 per cent. in *M. uniformis*. Positive results were also obtained for *A. barbatrostris* typ., which is a wild mosquito biting both man and cattle. The evidence of filarial infection in the population may be gauged from an investigation in a number of kampongs totalling 606 men, 96 women and 93 children with parasite indices of 32.2, 27.1 and 11.8 per cent. It seems evident that with infective indices such as have been met with in the *Mansonia* species of mosquito in nature these mosquitoes may be regarded as the transmitters of filaria infection. The highest index of infection occurred in *M. annulifera* and this is due to the domestic habits of this mosquito. W. F. Harvey

BRUG (S. L.) *Filaria bancrofti*-overbrengers op Kabaena. [Vectors of *F. bancrofti* in Kabaena.]—*Medisch District d. Volksgezondheid in Nederl. Indië* 1933. Vol. 27 No. 1-2 pp. 68-67. With 3 diagrams. English summary

The English summary is substantially as follows:—

An investigation of *Filaria bancrofti*-vectors was made in a coastal village of Kabaena Island (South of Celebes). Complete development of ingested microfilariae was found in *Anopheles barbatrostris*, *A. aconitus*, *Culex fuscescens*, *C. whitmorei*, *C. fatigans*, *C. alis* and *C. tishani*, *C. sumichrasti*. Probably *Anopheles maculatus* too can act as a vector. Lack of specimens prevented following up the development to the end. Development is completed in 10½-14½ days.

In *Culex alis* and *C. tishani*, *C. tritaeniorhynchus*, *C. bitarsiorhynchus* and *Aedes (Stegomyia) albopictus* the ingested microfilariae often survived as long as 10½-14½ days, but failed to develop properly. These species thus showed a rather high artificial infection index, that might give a false impression about their suitability as vectors. Therefore the author calculated two artificial infection indexes, firstly a "crude" one and secondly a "corrected" one. Mosquitoes containing only larvae with very retarded development or with none at all were considered negative in the determination of the "corrected" artificial infection index.

Although 20% of the adults of the village harboured *F. bancrofti* the natural infection index proved to be very low. It was 0% for *Anopheles barbatrostris*, 2% for *A. aconitus*, 0.5% for *Culex fatigans* and 1.5% for *C. alis* and *C. tishani*. In all 900 mosquitoes were examined but mature larvae were not found. [See C. Reeling Knap this Bulletin 1930 Vol. 27 p. 986.]

CHATTERJI (S. N.) Filarial Manifestations simulating Leprosy.—*Internat. J. Leprosy* Manila, 1933. Jan-Mar Vol. 6. No. 1 pp. 74-78. With 1 fig. & 1 plate.

Two cases are described in which there was doubt between diagnoses of filariasis and leprosy. In both there were thickened lymph vessels somewhat like enlarged nerves. In one there was a flat patch with raised edge but no anaesthesia, in the other a lymphatic cyst simulating a cold tubercular abscess but yielding microfilariae. C. L.

O'CONNOR (F. W.) & BEATTY (H. A.) *Wuchereria bancrofti* in Mosquitoes of St. Croix.—*Trans Roy Soc Trop Med & Hyg* 1938 Jan 25 Vol 31 No 4 pp 413-430 With 5 figs [11 refs]

Essentially this paper gives the results of conclusions from the examination of 5 000 wild *Culex fatigans* collected on St. Croix.

The Danes began to import slaves into the island in 1734 the year after they obtained possession of it but any disease data they collected are not on the island. The first records of filariasis are in the death returns of the Moravian missionaries kept since 1844 in that year appears rose lymphangitis and thereafter elephantiasis frequently. The work of KNOTT personally communicated having shown that using 10 cc. of blood the microfilarial index lay between 40 and 50 per cent in Christiansted, the infection of mosquitoes was investigated for larval forms of *Wuchereria bancrofti*. To eliminate those of other filariae many animals wild and domesticated were examined. Only in dogs and ground doves were larval filariae found. Neither in *C. fatigans* nor in *Aedes aegypti* could heavily infected blood induce infection except most rarely, and ground doves live remote from dwellings. Similarly equines are mostly stabled in the country and they were not examined. Of the 5 000 wild mosquitoes examined 25.08 per cent showed infection at some stage but only 2.3 per cent at the infective stage while the figure of infectivity for those who became infected was 9.1. Infectivity percentage was least 0.9 in the Municipal hospital and greatest 3 in a house where microfilariae were present in the blood of one of the inhabitants yet it was 2.05 among 2,339 *Culex* collected promiscuously in the town. Three of the mosquitoes had in them larvae at 3 different stages of development signifying three infective feeds. The percentage of parasitized *Culex* which were infective varied with the month being 16.8 of 635 in July and 0 of 208 in March, April, May and October. Of these *Culex* 46 had more than 50 larvae apiece the highest number was 318 and 11 had more than 100. As to larval distribution the greatest numbers in any one mosquito were two in the proboscis three in the head, 21 in the thorax and four in the abdomen. Of *Aedes aegypti* 49 per cent were infected but in no case did larvae reach infectivity. In *Anopheles albimanus* and *Culex habilitor* development went on to infectivity as already reported by KNOTT and Beatty but with the active anti-malarial work in St. Croix there are few of these mosquitoes. *C. fatigans* 50 in each batch were dissected 4 to 16 and again 16 to 20 hours after an infective meal. In the first batch 1,546 larvae were found there being in the stomach 289 dead 71 feeble 590 active and in the thorax 596 in the second batch the corresponding numbers are 1,334 591 92 8 and 643. It is repeated that for 24 hours after a feed microfilariae and their sheaths are passed by mosquitoes per anum and the boxes made up of microscope slides fastened together and then separated for examination by which this is proved are illustrated as is an infective larva leaving a mosquito's proboscis.

Although as noted 9.1 per cent. of experimentally infected mosquitoes became infective it is felt that in nature the effective number will be much less. Many insects are killed by animals and the elements and smashed when biting. Others waste infective larvae by biting hosts other than man and perhaps in other ways. Among methods advised for lessening infection and checking its degree are

general and detailed surveys of man and mosquito repeated in three years propaganda, screening of water mosquito nets their maintenance the keeping of fowls near the house and the attempt to get the people to kill mosquitoes. C. L.

GALLIARD (Henri) Contribution à l'étude de la filariose humaine à *Filaria malaya* et *Filaria bancrofti* au Tonkin [A Study of Infection with *F. malaya* and *F. bancrofti* in Tonking].—Ann de l'École Supérieure de Méd et de Pharm Indochine. 1935-1937 Vol 1 pp. 53-62 With 1 map [16 refs.]

Galliard compares the incidence of filariasis in Tonking now and in 1911 as well as the findings in different areas of *Mf bancrofti* and *Mf malaya*.

In 1911 MATHIS and LEGER found these infection rates with microfilariae in the Delta the middle region and the upper region—4.96 1.46 and 1.65. Galliard's corresponding figures in 1937 were 7.20 2.70 and 3.70 the later findings are nearly double the earlier ones the difference is probably that displayed by thick drop as compared with smear the totals examined are roughly comparable. As to the incidence of the two microfilariae now the examination of 1,121 persons in the Delta showed these percentage infections *Mf malaya* 5.1 *Mf bancrofti* 2.2, total 7.3 the corresponding figures for the middle region were 251 1.2, 1.6 and 2.7 and for the upper region 241 0.41 3.3 and 3.7 the total figures were 1,363 4.54 2.71 and 7.27. Of those infected, 63 per cent harboured *Mf malaya* and 37 per cent *Mf bancrofti*. When there were uro-genital lesions their cause was always *Wuchereria bancrofti*. C. L.

DE CHOISY (H.) Observation d'un cas de Microfilariose Loa traité par l'antimoine-thiomalate de lithium [A Case of Loa Infection treated with Antimony Thiomalate of Lithium].—Rev Méd et Hyg Trop 1937 Nov-Dec. Vol 29 No. 6 pp 284-296.

After a course of antithiomalme injections the swellings became rarer and then disappeared.

The patient had after a tour in Gabon in 1935 begun to have swellings while in France five months later and had many filarial embryos in the blood, no further details being given. During February to March 1936 he had 17 injections of hectine without effect. In January 1937 he had 11 injections of antithiomalme, roughly every other day namely 2 (twice) 3 (three times) 4 (four times) and 3 (twice) cc of a 6 per cent solution. While before that he had never gone a week without an attack of swelling, he had two in February, two in March, two in April and no more when the paper was sent off on 13th December. The condition of the blood as to microfilariae at this time is not mentioned. C. L.

DE GREY (R.) Quelques considérations sur 101 cas d'éléphantiasis ou adénolymphocèle opérés à Buta. [A Hundred and One Cases of Elephantiasis and Varicose Lymph Glands operated upon at Buta].—Ann Soc Belges de Méd Trop 1938 Mar 31 Vol 18 No 1 pp 5-39 With 21 text figs & 5 figs. on 2 plates [27 refs.]

Of these 101 persons only two were women. In spite of the fact stressed by STRONG that in Central America onchocerciasis is not

accompanied by elephantiasis it is held established that it is so in the Belgian Congo the possibility of mixed infections with as so often no microfilariae in the blood, being unmentioned. The mechanism of the production of elephantiasis is discussed. After operation 63 remained free from fever 16 had fever yielding to quinine in nine soiling by urine caused infection in eight tension on sutures by reason of an insufficiency of healthy skin caused slight necrosis in four after high fever there was recurrence of elephantiasis one died of embolism the day after operation. The operation is considered in detail and photographs show some 30 paraded for inspection before it

C L

- i. RISHWORTH (H R) Adult Filarial Worm of Unknown Species removed from the Skin of a Human Subject.—*Indian Med Gaz* 1938. Jan Vol. 73 No 1 pp 7-8
- ii. MAPLESTONE (P A.) A New Filarial Worm from a Human Being.—*Ibid* pp 8-10 With 3 figs

1. A European woman saw Rishworth in Bombay because she believed there was a worm under the skin on the front of her thigh. What seemed to be a swollen lymphatic was evident. About three years later after her left eye had been irritating for 10 days she saw CHITNIS who was satisfied he could see a worm under the conjunctiva and under local anaesthesia Sir J M DUGGAN removed what were thought to be two worms. A fortnight later "early in September she complained at night to Rishworth that she could feel a worm moving under the skin of the neck where she had a red patch  $1\frac{1}{2}$  inches across on the right side at the thyroid level. It seems to have been the recent removal of the worm from the conjunctiva which led to the noting in the patch of a pale streak 20 to 30 mm. long by 1 mm. across in the shape of the figure 2. One end was slightly knobbed and moved forwards with recessions at the rate of 2 to 3 mm. a minute. Next morning the lesion was a red patch 20 mm. by 12 mm. and raised 2 to 3 mm above the general surface. It was excised on 16th September and so it seemed 2 worms teased from the skin. The scar left was barely perceptible. There were no microfilariae in 15 thick blood films taken at various hours. Eosinophilia was 6 per cent. The patient had been in Madras for several months in 1920 1923 and 1932, in Malaya from 1924 to 1931 in Bombay since 1933 except for a short trip to East Africa in 1935 where she stayed in Nairobi for 10 days. The patient herself thinks she was infected in Calcutta a few years ago on a short visit where she was bitten by a large darkish fly which drew blood from her calf.

About eight months ago a male European consulted me about a pale worm like structure which was irritating him on the right side of the abdomen just below the ribs. It seemed to me to be a distended lymphatic about 1 mm wide and about 30 mm. long. I examined several thick films of his blood for microfilariae with negative results. In the light of the present experience it is within the bounds of possibility that it was a similar worm. He was very worried about the matter and was insistent that it was a worm. I sent the man to a colleague in Bombay for a second opinion and he succeeded in convincing him that it was a lymphatic and nothing to worry about. It disappeared in about ten days.

ii. Examination of the two worms showed that that from the conjunctiva was in two portions about 11.5 cm. long in all while that



Fig 2



Fig 3

Diagrams of a filarial worm of unknown species removed from under the skin of the neck of a European woman in Bombay. Fig 2—Anterior end showing vulva and vagina. Fig 3—Posterior end.

[Reproduced from the *Indian Medical Gazette*]

from the neck was 13-14 cm long by 0.6 to 0.64 mm broad. They were unfertilized females for whose descriptions the original should be read.

"These worms are clearly different from *Wuchereria bancrofti*, the common filarial worm of man in India. There is only one other possibly similar worm present in man in India, this is the parent worm of *Af. malays* but the adult has never yet been found, and unfortunately the absence of microfilariae in this case prevents this worm being identified with or distinguished from this unknown species.

"In some respects this worm is very like *Loa loa* because the shape of the anterior end, the short oesophagus, the position of the vulva and the cuticular bosses are similar, but it differs from *L. loa* in being two or three times as long, in having a straight posterior extremity and the anal opening subterminal. The worm also differs even more distinctly from all other filarial worms of human beings that have been properly described so it is apparently a new species, if not a new genus.

On account of its close affinities with *L. loa* and the fact that it agrees in all available particulars with the generic definition of *Loa* given by Baylis and Daubney (1926) it is proposed to place it tentatively in this genus under the name *Loa squarrosa* thus indicating its doubtful position, which cannot be fully established until the male is found.

C. L.

LANE (Clayton). Drug-induced Sterility of Female Filarial Worms.—  
Reprinted from *Vet JI* Vol 94 No 4 pp 158-161

On the general question of the cause of microfilarial periodicities, *Dirofilaria* infection in the dog should be able to shed light, if due allowance is made for the special blood conditions found in this infection. For example in *Wuchereria* infection the ebb of the microfilarial blood tide

is nearly complete a good example being that reported by Warrington Yorke and Blacklock (1917) in which the numbers in 1 ccm of blood were 12,850 to 50 or 257 to 1. In a like instance reported by Khaw and Chou they were 16 000 to 2,600 or about 6 to 1. The periodicity in the two infections is of quite different type and it follows that if the reticulo-endothelial system of the dog is not blocked by this overwork and if larvae are being destroyed rapidly as soon as born the difference may be accounted for by a timing of parturition which is not completely simultaneous. That means that if these worms empty their uteri and become spent when parturition takes place it will be possible to trace a correlation between spent worms and the microfilarial blood tide. In other words so far as it is possible to be sure that these worms live only in the right heart the charts of the microfilarial blood tide from specimens taken say two-hourly in a series of dogs could be correlated with the number of empty worms found in their hearts when they have been killed at different hours. That these empty worms occur is known but no attempt has been made to determine whether here as in *Wuchereria* infection they may reasonably be looked on as spent worms. That is the crux of this problem with its marked importance for man and beast.

LANE (Clayton) Sterilising Filarial Worms by Poison. [Correspondence]—*Lancet* 1938 Mar 12. p 636 C L

Lane reviews evidence for the belief that when microfilariae disappear from the blood on giving certain arsenicals they do so not because the drug kills them but because it sterilizes the mother worms. Microfilariae are no longer born and those that had been born before treatment are promptly destroyed by the reticulo-endothelial system. He cites the evidence of KHAW & CHOU [*Chinese Med J* 1936 Feb Supp No 1 pp 402-417] that when the giving of these drugs had caused the disappearance of *Mf immitis* from the circulating blood it was invariably found on killing such dogs and that so far from the adult worms being unaffected they had been sterilized for their uteri were all and always empty. Did the relief following neostibosan in ADAMS case [see below] come about because microfilariae were no longer entering the cornea the mother worms having been sterilized? In a patient with onchocerca nodules this could be investigated by excising one nodule giving a drug treatment which had lessened the number of larvae in skin or conjunctiva and excising a second nodule the condition of the female worms before and after treatment could thus be compared.

Since excision of onchocerca nodules about the head is itself a recognised part of treatment the spacing of two such excisions with an intermediate drug treatment seems in a chronic illness such as this, to be open to no objection and to be a most promising means of increasing a knowledge of the infection which can hardly but be of value to the many infected with this and kindred parasites.

O CONNOR (F W) & BEATTY (H A.) Filariasis of Ground Doves in St. Croix, Virgin Islands.—*Trans Roy Soc Trop Med & Hyg* 1938 Jan. 25 Vol. 31 No 4 pp 407-412. With 5 figs. on 4 plates C L

The destruction here reported of microfilariae which are circulating in the blood can hardly but be significant for the like condition in man. The adult worm *Vagrisilaria columbigallinae* Augustime 1937 lives in the blood stream in the liver lungs pancreas heart and between



the intestinal coils. Examinations of blood drawn from veins every two hours during life and serial sections of other 12 birds killed at two hour intervals showed no periodicity. Microfilariae in heart and lungs were normal in appearance were in mudstream and did not adhere to the walls only in the liver were there striking changes in their structure.

"In the livers of thirty four doves, on holding to the light sections stained with haematoxylin and eosin local areas of smaller or larger size could be seen which were much bluer than the rest of the hepatic tissue. These areas were frequently at or near liver margins and were sharply differentiated from the adjacent healthy tissue. Sometimes only one such area was found but at other times several islets of such tissue were observed. The position of these areas did not seem to bear any relation ship to the site of adult parasites in the liver and were found in doves in which parent worms were present only in the lungs. On microscopical examination, the "blue" areas were found to be heavily infiltrated with lymphocytes amidst which were a large number of multinucleate giant cells. Varying numbers of eosinophil leucocytes were scattered or grouped in the vicinity. While microfilariae generally dead and degenerating were scattered throughout the liver they were much more numerous in the "blue" areas and especially in the giant cells. In one section,  $7\mu$  thick  $\frac{1}{2}$  inch square, 336 giant cells were counted and, in 130 of these, degenerated microfilariae were found. Examination of serial sections showed microfilariae in many of the other giant cells. Owing to the curled position of the dead embryos, the giant cells frequently appeared like a spiral nebula. In the livers of eleven doves giant cell formation was not present, but islands of dense round-celled infiltration with eosinophils were conspicuous. In many of these islands degenerating microfilariae were seen. In two livers there was no such marked cellular reaction and it is worth noting that in both of these cases very few microfilariae were present in the general circulation nevertheless, dead and degenerating microfilariae were found between some of the liver cells. In all cases where present, the dead microfilariae showed every stage of degeneration varying from cloudy specimens, with otherwise clear morphology to forms in which a chain of fragmented nuclei alone revealed their presence. The whole picture seen again and again in the different livers suggested massive death degeneration and absorption of parasites going on continuously in the organ."

C L

SWERT (W. C.) & PILLAI (V. Madhavan). Clearance of *Pistia stratiotes* as a Control Measure for *F. malayi* Infection.—*Indian Med Gaz.* 1937 Dec Vol 72. No. 12. pp 730-734. With 4 figs.

This paper carries on the reporting of the work inaugurated by IYENGAR [this *Bulletin* 1937 Vol 34 p 884] in the Shertalai taluk of North Travancore where filarial infection is disclosed by the presence of *M. malayi* exclusively.

The carrier *Mansonoides annulifera* deposits its eggs on the water plant *Pistia stratiotes* and its larvae and pupae pierce this plant's roots and thus get the air they need without coming to the surface. The campaign consisted in clearing *Pistia* from an area at first of 15 square miles with Shertalai town as its centre. In 1937 the area was increased to about 39 square miles. The number of rounds made by workmen clearing *Pistia* since 1933 has been 14 and whereas the first round took 249 days the last took 28. No *Mansonoides* were caught here after 1933 although the catches of other mosquitoes were not appreciably lessened.

In more detail the number of *Mansonioides* caught per hour in the centre of the controlled area and outside it were in the last five months of 1934 0.8 and 12.9 and in the first three months of 1937 (to which date the report takes the figures) 0.0 and 7.6. Similarly blood smears taken in April 1937 from 87 children of four years old or less in the centre of the Pistia-cleared area showed one infection from 87 children living outside this area 23 infections. It is emphasized that here is an excellent example of the suppression of a mosquito-borne disease by a strictly limited species control of the carrier C L.

MARBAIX & APPELMANS. Kératite d'origine filarienne [Filarial Keratitis].—*Arch d'Ophthalmologie* 1937 Nov NS Vol. 1 No 11 pp 978-984 With 2 figs [15 refs]

Essentially a histological report on a piece of conjunctiva cut out for the diagnosis of onchocerca infection.

A woman of 28 had passed six years in the Belgian Congo and then two in Belgium. The conjunctiva was almost blood red the cornea showed greyish patches mostly peripheral, the rest of the eye was normal. A close examination found no nodules anywhere on the body. A piece of conjunctiva was cut out it showed an epithelium perhaps slightly thickened but not ulcerated and not infiltrated with leucocytes below it capillaries were dilated the connective tissue was infiltrated with large reticulo-endothelial cells lymphocytes polymorphs and eosinophils while some blood vessels had a cuff of mononuclear cells. A haemorrhage present was probably traumatic caused during the excision. An inflammatory nodule had a necrotic centre with successive surrounds of polymorphs and mononuclears epithelioid and seemingly giant cells. Microfilariae were found immediately under the epithelium with diffuse or with but little cellular infiltration round them but granulomatous nodules showed no microfilariae possibly they had been absorbed. Diagnosis of the condition must be based it is insisted, on the finding of microfilariae. C L.

- I. STRONG (Richard P). Onchocerciasis in Africa and Central America. Part I. *Supp to Amer J Trop Med* 1938 Jan. Vol. 18 No 1 pp 1-57 With 44 figs [52 refs]
- II. HISSETTE (Jean). Onchocerciasis in Africa and Central America. Part II. Ocular Onchocerciasis. *Ibid* pp 58-90 With 20 figs (14 coloured) [17 refs]
- III. SANDGROUND (Jack H). Onchocerciasis in Africa and Central America. Part III. Helminthological Observations and their Bearing on Certain Aspects of the Biology of *Onchocerca*. *Ibid*. pp 91-115 With 4 figs & 1 plate

These three papers from the Department of Tropical Medicine Harvard University Medical School, together with a fourth by BEQUAERT on the Simuliidae of the African Congo \* make up an important monograph dealing with and considering the facts collected by Professor STRONG's expedition in 1934 to a remote part of the Belgian Congo. The publication has been made possible by the aid of Harvey S. FIRESTONE senr and jr. Each of the four parts has its abstracted separately

separate list of references those in the text are not always found in the list attached to that or any part

i. Part I follows in considerably greater detail the lines of the first Chadwick Lecture of the Royal Society of Tropical Medicine and Hygiene [this *Bulletin* 1937 Vol 34 p 894]. For example while in Central America and much of Africa, the onchocerca nodules on any individual number generally one or two as many as five or six being unusual, in Kassende it was not uncommon to find 25 to 100. The nodules do not it is believed, indicate the place where Simulium bit for in Guatemala where head nodules are common the flies were frequently found biting the legs and the heads of natives were generally covered by hats in the daytime (when the flies bite) and were also protected by coarse bushy hair rather it is felt are they found where lymphatics converge or some pressure impedes the free flow of lymph in them. In drug treatment it is questioned whether anything will kill microfilariae and spare the host. Note is made of the reticulo-endothelial reaction (it is not given that name) in the nodules and the question of onchocerca infection without nodules is considered, the point being raised as to whether parasites so found have been mature if unencapsuled female worms are mature this would explain the persistence of microfilariae in the skin and eyes when no nodules can be found and this part ends with the words "Only from further autopsies can it be told how generally the fully mature parasites are found free in the deeper tissues of man"

ii. By the courtesy of the Belgian Government Hissette accompanied the expedition as oculist and notes that had knowledge in 1934 been what it now is there would have been no need for the expedition to have taken the long and trying journey it did to visit this small region of hyperendemicity large and heavily infected regions are, it seems more readily accessible. In the eye inflammatory exudates may be present where there are [at the moment] no larvae and larvae in impressive numbers may coexist with no obvious lesions the condition is summed up as a slight and slow reaction to living larvae and a clear appreciable reaction to dead ones. The ocular appearances are given in detail and illustrated by 14 beautiful figures in colour. Typically the pupal becomes dragged downwards and oval or pyriform this is attributed to a deposit of fibrin and dead microfilariae in the anterior chamber. There are described the appearances of the iris which as a rule remains light proof a punctate keratitis a vascular keratitis of the outer inner and lower quadrants lesions of the pigmented epithelium and a choroïdo-retinitis the last ending in optic atrophy and constituting the true cause of the final complete blindness with no perception of light.

iii. Sandground found the worms smaller than usual, 20 males averaging 24.1 mm long (18 mm to 30 mm) no females were got out whole but nothing was found to suggest that the species was not *O. volutus*. On the question of unencapsuled worms it is noted that the extensive autopsies needed to settle this point could not be done but in agreement with the experience of Hissette it was found that though search might have to be assiduous, yet a nodule was always found eventually when microfilariae had been discovered in skin or conjunctiva. The fact that apparently single nodules are or may be compounded of as many as seven small ones each with separately walled-off worms has not had sufficient emphasis. It is believed that *O. volutus* is a parasite of cattle and claud as well as of man. C L

ADAMS (A. R. D.) A Case of Onchocerciasis (Filarial Blindness) with  
Manifestations developing in Britain.—*Lancet* 1938 Mar 5  
pp 545-548

An onchocerca infection without nodules but causing defective sight and with diagnosis established by recovery of microfilaria. The man's travels extend from Australia to Canada and by land from Capetown to Egypt Palestine Turkey up the Danube to Germany and so to England but taking Cyprus on his way. Defective vision took him to many hospitals and finally to the ward of the Liverpool School of Tropical Medicine as being one of the few institutions which he had not yet tried. Averaging three blood counts made on one day he had an eosinophilia of 33 per cent. he had also small multiple areas of opacity in the pupillary region of the cornea in both eyes no microfilariae in the blood night or day even on centrifuging considerable quantities nine *Mf* *volulus* in a small piece of bulbar conjunctiva taken from the left eye the same parasite in three of some 48 smears from the skin of various parts of the body made at various times none in 0.25 cc of aqueous fluid, a few seen on two occasions on which the slit lamp was used though they withdrew themselves on treatment his eyes and vision rapidly improved. Under simple palliative the condition was still better. Adams further reports that the man had, some two years earlier had a course of neostibosan with rapid improvement of vision and a drop of eosinophils from 40 to 5 per cent though complete absence of symptoms till photophobia and redness appeared in England in 1934 though the man had probably been infected in the Katanga Province of the Belgian Congo between 1929 and 1931.

Treatment consists of the mechanical removal by surgical means of the adult worms. Excision of the nodules and their contained worms under local anaesthesia is simple and effective. No known drug administered by conventional routes will destroy the adult worms but the larvae can be killed by certain antimony compounds and also by Plasmochin and possibly by other organic preparations. Their destruction is not of permanent value as they are rapidly replaced by fresh supplies of larvae from the mature adult worms, which are unaffected by such drugs. The fact that a course of neostibosan arrested the progress of the trouble in the acute stage is readily explicable by the known action of such compounds on the microfilariae.

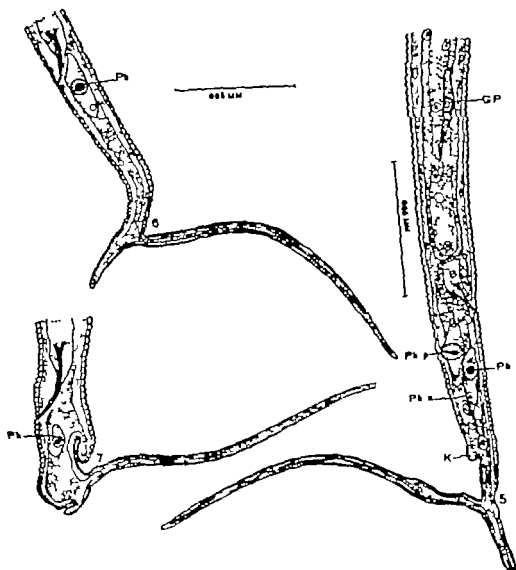
C. L.

RODHAIN (J.) & GILLAIN (J.) Présence de nodules & Onchocerca chez un bœuf du cap dans le Haut-Ivori. Nodules due to Onchocerca in a Cape Buffalo in the Haut-Ivori.—*Soc. Belge de Méd. Tr. p.* 1938 Mar 31 Vol 18 No 1 pp 83-88. With 4 figs on 1 plate.

Nodules found in *Bos capensis* are provisionally attributed to *Onchocerca* *gibsoni*. In 2 nodules the worms or their surroundings showed no traces of microfilariae so it is concluded that these females had not been fertilized. In the illustration of a cut nodule the worms are empty not only of microfilariae but of viscera.

C. L.

MOORTHY (S. V.) Observations on the Development of *Dracunculus medinensis* Larvae in Cyclops.—*Amer. J. Hyg.* 1938 Mar Vol. 27 No 2 pp 437-460. With 1 graph & 19 figs on 5 plates [16 refs]. No sufficiently detailed morphological study of the development of the guinea-worm larva, whether in cyclops or in a definitive host having yet been made this investigation was put through.



First stage larva of *Dracunculus medius* (abnormal type)

Figure 5—Posterior region of larva showing the dorsal knob (K) and the dorsal finiform appendage in the tail

Figure 6—Anterior region does not show the dorsal knob

Figure 7—Showing other rare abnormalities noticed in the tail

Explanation of abbreviations: GP = genital primordium Ph = phasms  
Ph n = phasms nucleus Ph p = phasms pore

[Reproduced from the *American Journal of Hygiene*]

Larvae swallowed by the two local forms of cyclops *Mesocyclops leuckarti* and *M. hyalinus* more easily infected them when these crustaceans were immature than when they were adult the former species being the more susceptible. In nature more than one larva was not seen in a cyclops in the laboratory as many as 20 while one cyclops with two larvae lived for 107 days. When heavily infected they tended to remain at the bottom of a receptacle and usually did not live more than a month while shallowness of water increased their life-span moreover when immature apparently sterilizing the host. When less than five larvae parasitized one cyclops all reached infectivity at the same time when more development was delayed and ceased to be synchronous. A similar delay was present if there had been previous infection by a larva of *Camallanus strept.* and in the last instance development only went as far as the second or even the first ecdysis. Again when cyclops in which larvae had developed for two or three weeks were submitted to a reinfection 60 to 70 per cent of them died within 24 hours. Larvae treated with hydrochloric acid or bile before entering cyclops soon died.

When young *Gambusia* fed on larval guineaworms a number of these passed through the fish and remained viable with *Barbus puehelli* few did so. The fixative used for larvae was mercuric per chloride 0.52 sodium chloride 1.04 distilled water 100 when used cold the larvae were apt to undergo evisceration (a condition lending itself to ready study of the alimentary tract) when used boiling they were killed and fixed at once. The development of the larva is described in detail it undergoes one moult on the 5th to 7th day at 90° to 102°F but three days later at 55° to 70°F there is a second moult on the 8th to 10th day at the higher temperature and on the 13th to 16th at the lower.

A re-description is given of the abnormal larvae already described [this *Bulletin* 1937 Vol. 34 p. 466]. The appendage is not lateral, but ventral to what was considered earlier to be a blunt tail and Moorthy seems uncertain which to call the tail. [To the reviewer the natural thing seems to call the long structure the tail with abnormal prominences on dorsum and venter.] It seems that these abnormal larvae do not survive seeing that in several thousands of cyclops examined only three larvae of this type have been seen undergoing the first moult and only one possibly of this type which has undergone the second.

MOORTHY (V. N.) & SWEET (W. C.) Further Notes on the Experimental Infection of Dogs with *Dracontiasis*.—*Amer. J. Hyg.* 1938 Mar. Vol. 27 No. 2. pp. 301-310. With 3 plates.

This carries on the report on experimental work of infecting dog pups with *D. medinensis* [this *Bulletin* 1937 Vol. 34 p. 35]. Of the 32 dogs used the parasites had developed in four. One was given eight infective feeds within 20 days when it was about five months old about a year later there were symptoms of infection and within the next two months 10 female guineaworms were removed. At autopsy 15 months after infection 11 more adult female but no male worms were found. There had been a second feeding a year after the first but no worms corresponding to it were found. In another dog

killed 132 days after its first infective feed and 103 days after its last nine male and 23 female guineaworms were found, the former varying from 2.1 to 2.9 cm. the females from 2.5 to 50 cm.

In dog no. 23 one immature female guinea worm (15 mm long) was found in the chamber of the left ventricle. In dog no. 20 one male worm was found in the precordial fat and another between the meninges and the occipital region of the skull, while two long female worms were found coiled up in the right orbital region (1936). Aside from these unusual locations, the worms were most commonly found in the subscapular and retroesophageal areas. The next most common situations were in order inguinal region, vertebral column (usually males and small immature females), extremities, the chest wall, and the abdominal wall.

In one dog dying in an epileptiform attack a male *Dracunculus* was found in the meninges of the brain and there should be in mind the possibility that like attacks may take place in man two or three months after infection. All the animals had heavy hookworm infection before the infective *Dracunculus* feeding, and the point is raised whether the lesions so formed make easy the entrance of *Dracunculus* larvae. The greater susceptibility of young dogs may be due to age influence in an abnormal host or to lack of an acquired immunity which the writers think is the best explanation in man.

The findings of live male worms in the tissues of the experimental dogs would seem to be strong evidence that copulation takes place in the deeper body tissues and not, as considered by some in the intestines. Pairs in copula were not found in the tissues, but unless copulation takes place after migration from the stomach or intestines, it becomes difficult to explain the presence of male worms in the tissues. The later history of the males is still obscure, as no evidence of either calcified or degenerated males was found in dog no. 14 which had fully mature female worms. Sketograms of this dog at different intervals and in different positions at no time gave evidence of the presence of any calcified worm in its tissues, so it seems more probable that male worms after performing their function of fertilizing the females, die and are absorbed, calcification occurring only rarely if at all. It seems probable that this is also true of many female worms which are not fertilized or even if fertilized, fail to find their way to the exterior from the deeper tissues.

Human gastric juice killed and digested infective larva within 18 hours. These varied in infectivity.

"Cyclops containing smaller numbers of larvae were preferred as it was generally observed that the smaller the number of larvae in the cyclops, the better was their development and the greater was their activity when stimulated by 0.2 per cent HCl or fresh bile.

Again 50 larvae were needed to insure infection, but when their numbers were between 50 and 300 the fewer used the greater the percentage that developed to adults.

C. L.

GORE (Ramkrishna N.) Ichthyol as a Treatment for Guinea-Worm.—*Indian Med Gaz* 1938 Mar Vol 73 No. 3 p 139

In three instances after an ichthyol compress an inflamed skin over a guineaworm returned to normal. In one the worm had "pointed" in the others the skin remained intact.

C. L.

MAPLESTONE (P. A.) & BHADURI (N. V.) Gnathostomiasis in Human Being.—*Indian Med Gaz* 1937 Dec Vol 72 No 12. pp 713-715. With 1 fig.

The report of a fourth case of gnathostoma infection of man in Bengal, with a survey of the subject.

The man had not been further from Calcutta than Benares and Puri. Three months earlier a swelling appeared for a few days on the inner aspect of the left arm just below the elbow. Then others appeared each nearer the hand than the last. Finally with a painfully swollen hand an object showed itself and was removed from the tip of the second finger. It was an immature gnathostome 2.5 mm. long with four rows of spines on the cephalic bulb. Analysing the records of 25 infections in man mostly from Siam they become evident as sudden swellings with which there may be pricking or boring pain disappearing in a day or two and reappearing elsewhere at irregular intervals in widely separated parts of the body for months even for over a year. Yet on removal of a single worm they cease even when symptoms have included haematuria and haematemesis. Suppuration seems commonest in the breast and a creeping eruption is exceptional. Swelling of the pharynx with dyspnoea of varying degree has distinguished about half the cases. The life history with progressive infection of cyclops, fish and cat as the normal is pointed out as is the way in which the backward pointing spines partly covering the body cause every movement of the worm or of the tissues in which it lies to urge it forwards. The method of preservation by hot 70 per cent spirit or 5 per cent formalin is described. C L

AFRICA (Candido M.) REFUERZO (Pedro G.) & GARCIA (Eusebio Y.)  
Further Observations on the Life Cycle of *Gnathostoma spinigerum*  
—*Philippine JI Sci* 1936 Oct Vol. 61 No 2 pp 221-225

The essential paragraphs of this paper the journal containing which was received by the Bureau of Hygiene and Tropical Diseases on 17th March 1938 are as follows. —

The consistent failure of Prommas and Daengsvang (1933 and 1936) to infect cats with cyclopes containing *G. spinigerum* larvae from 7 to 30 days old and their (1936) success in infecting a fresh water fish (*Clarias batrachus*) with encysted larvae by feeding it with experimentally infested cyclopes — our accidental finding of encysted gnathostome larvae in the flesh of three species of fresh water fishes under natural conditions — and finally our successful infestation of a presumably clean cat with adult gnathostomes occurring in a typical stomach nodule by feeding this animal with encysted larvae from naturally infested *Glossogobius giuris* all seem to point definitely to the fact that gnathostomes require in their life cycle a second intermediate host in the form of a fresh water fish.

Our finding of gnathostome larvae apparently of two distinct groups with regard to size and degree of development in *Hurria rhynchops* (Schneider) has developed a peculiar situation insofar as snakes are concerned in the life cycle of *G. spinigerum*. In our first paper on this subject (Africa, Refuerzo and Garcia 1936) we remarked that the fact that the larvae which Chandler (1925) recovered from snakes approximate both in size and structure the encysted larvae from the flesh of fishes would imply that the snakes act in the same capacity as the fishes which even at that time we already believed to be the second intermediate host of *G. spinigerum*. On the other hand we mentioned the possibility of the snakes assuming the rôle of the so-called unsuitable host of this nematode that is one that would allow the development of the worm only up to a certain stage short of maturity and not become a second intermediate host.

A cat presumably free from previous infestation of *G. spinigerum* has been successfully infested with this gnathostome by feeding it with encysted larvae from a naturally infested *G. giuris* (a fresh water fish)



No doubt as the authors say it is difficult to deal adequately with all the great advances in tropical medicine and hygiene in the last ten years but the new edition can be confidently recommended to those for whom it is intended who have a knowledge of the German language.

E D H Greig

SCHILLING (Clara) *Die Methoden der experimentellen Chemotherapie.* [The Methods of Experimental Chemotherapy]—104 pp. With 18 figs [Numerous refs] 1938 Jena Verlag von Gustav Fischer [Rm 4-50]

In his introduction Schilling likens chemotherapy to an assault in which the enemy are the infections which produce disease and the object the annihilation of the opponent. The weapons are self forged and a condition of the battle is the complete preservation of the battlefield. The object of this book is to describe the tactics and method of this warfare. Since the book is intended to be of a practical nature, the author has to a large extent refrained from dealing with purely theoretical considerations. The more important methods are described in detail but those which are less important are merely mentioned.

The first chapter is concerned with the technique of experimental infection and treatment here the author describes briefly the various methods for infecting animals by different routes and also the various means by which drugs can be administered. The following chapters deal respectively with the chemotherapy of bacterial infections, spirochaetal infections, protozoal infections, worm infestations, rickettsia infections, bartonella infections, virus infections and experimentally produced tumours.

Chapter V which is by far the longest is devoted to a discussion of experiments relating to chemotherapeutic action. As might be expected, recent work on the mechanism of action of drugs on trypanosomal infections and the phenomenon of drug-resistance receive a prominent place here.

Schilling has succeeded in condensing a vast mass of information within the compass of a small volume. The book however does not suffer from over-condensation: it is clearly written and should be easily followed even by those who have not made a special study of this difficult but very important subject. There is a very extensive list of references which are so arranged that it is a simple matter for the reader to discover the literature relating to any particular point.

W Yorks

CALCUTTA *Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases 1937* (CHAORNA [R N] Director)—181 pp. With 1 plate & 4 charts 1938. Alipore Bengal Govt Press.

This annual report is not presented solely by the Director of the School of Tropical Medicine who is also Medical Superintendent of the Carmichael Hospital, but contains fairly extensive reports of the several professors, lecturers and heads of research departments. As it carries the work done up to the end of 1937 it may be looked on as a valuable indication of the trend of recent activity in the investigation of diseases in the tropics. Financial assistance for

research has been generously forthcoming from the Indian Research Fund Association the Rockefeller Foundation and the Imperial Council of Agricultural Research. The investigations based on the School under Indian Research grants were the Enquiries (1) Indigenous Drugs (2) Malaria Transmission (3) Medical Mycology (4) Helminthology (5) Cholera (6) Kala-azar (7) Anaemia of Women (8) Epidemic Dropsy (9) Leprosy and (10) Filariasis. Fellowships were awarded to workers by the Rockefeller Foundation to enable them to visit and study in Europe and America. Special investigations mentioned by the Director are those of Weil's disease and epidemic dropsy. It seems certain now from the accounts of outbreaks of jaundice in different parts of the country that Weil's disease has long been existent in India. [This it may be remarked is a view which has long been held.] It is remarkable that there are no published cases in which the causal organism was definitely demonstrable.

In this report itself however is the intimation of recent isolation of a *Leptospira* from patients with acute jaundice which is serologically identical with the classical Dutch strain and two English strains but differs from many eastern strains. It seems probable therefore that the want of published data from India will soon be remedied. Epidemic dropsy has at one time and another formed the subject of special research in the school during the past 15 years. It has now been investigated from bacteriological and epidemiological points of view. The director himself has in the past been the author of much pertinent research into the presence of a histamine like body in diseased rice and the production of deleterious changes in stored rice by gram-positive spore-forming aerobic organisms. He examines the subject afresh in this report in the light of the bacteriological findings by the present research workers. The epidemiological studies make out a revived case for the toxicity of mustard oil as a cause of epidemic dropsy. It will however be necessary to exclude completely an element of direct damage by the oil to the kidneys and production of renal oedema, before this mustard oil hypothesis will suffice to explain all the known facts.

Under the heading Research in various Departments mention is made by the director of the more important investigations that have been carried out. These are still further elaborated in the special reports which are included. An interesting finding by the professor of tropical medicine was the high incidence of a positive Van den Bergh test in splenomegaly whatever the cause of the condition only excepting myeloid leukaemia. Much work has been done in the bacteriological department of the School on a great variety of subjects of which cholera as usual, presents an importance which extends much beyond the confines of India. The presence of *Rhizosporidium seedens* in two cases of tissue removed from a lesion of the foot is a noteworthy fact and represents possibly an unsuspected localization of this organism.

Snake venoms are receiving much more attention since it has been found that therapeutic applications for these poisons are being explored. It is fitting therefore that in the pharmacological department of the School investigation along physiological lines on cobra Russell viper and Echis venoms should be actively prosecuted. This department also has its hands full over the indigenous drugs enquiry. In the Report of the Anaemia and Respiratory Diseases Department there is much of interest in the examination of bone marrow in various

diseases by sternum puncture the continuation of work on normal blood standards and the choice of an anti-coagulant for estimation of cell volume. An anti-coagulant mixture as recommended by WINTROBE of 6 mgm ammonium and 4 mgm. pot. oxalate for each 5 cc. blood has given satisfaction as an isotonic system and obviates the use of factors to correct shrinkage. Another study in this department is on the diurnal variation of leucocytes in the tropics. It is interesting to find that the investigator while confirming the hour to-hour variation—presumably distinct from the variation of random sampling—lays down that it is independent of the digestive process "is due to redistribution of cells and is not accompanied by any departure from the normal leucocyte formula in the Arneeth count." Amidopyrine experiments on monkeys in the attempt to produce agranulocytosis were negative. Administration of 3 grains daily for 23 days and of 6 grains daily for seven days proved unsuccessful.

The announcement of the early appearance in book form of coloured illustrations of dermatological lesions only a few of which have been already published, will be eagerly welcomed by those who have seen the fine collection. It will be in the form of a memorial to the late Col. Acton whose family is to be responsible for the financial assistance to render this possible.

Many other matters of therapeutic and research importance are contained in this the latest annual report of the Calcutta School of Tropical Medicine. Successive reports might we think, be given their serial number on the title page to show how they are steadily drawing away from the date of foundation. *W. F. Harvey*

# TROPICAL DISEASES BULLETIN.

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[No 11

## THE TYPHUS GROUP OF FEVERS

MADRAS REPORT OF THE KING INSTITUTE OF PREVENTIVE MEDICINE  
GUTHRY FOR THE YEAR ENDING 30TH SEPTEMBER, 1938 [SHORTT  
(H. E.) Director] (Typhus pp 30-32.)

Two cases of typhus had been recently reported in St. Thomas Mount not far from the Institute. With a view to the discovery of a vertebrate reservoir and the arthropod vectors squirrels and their ectoparasites were first examined. One hundred and thirty four squirrels were tested for Weil Felix reaction, 58 gave negative results and 66 agglutinated *Proctos OAK* from 1/25 to 1/200 dilution. Seventy-five ticks 700 lice 385 mites and fleas were collected from the nests of squirrels and from the animals themselves and injected into guinea pigs but without result nor could any *Rickettsia* be detected in smears from the crushed parasites. The examination of 90 bandicoots and their parasites also gave negative results. D Harvey

CUMMING (Hugh S) Le typhus exanthématique aux États-Unis.  
(Exanthématique Typhus in the United States.)—Bull Office Internal  
d'Hyg Publique 1938 Feb Vol. 30 No 2 pp 296-297  
Cases of typhus reported in the United States since 1931 are as follows —

Year	Cases	Year	Cases
1931	300	1934	1 807
1932	904	1935	1 185
1933	1 922	1936	1 682

The majority of the cases in 1936 occurred in the Southern States Georgia Alabama and Texas. Practically all the cases were endemic typhus and few or no cases of louse-borne typhus were reported. These cases of endemic typhus which at first were confined to urban areas are now reported in increasing numbers from rural areas and new reservoirs of the virus have been found in field mice rats marmots and squirrels.  
(1939)  
D H

DEBOYE (P) CANET (J) & TRUONG-VAN HUYN Note sur une petite épidémie de typhus tropical survenue dans un groupe de plantations du Cambodge [A Small Epidemic of Tropical Typhus (Scrub Typhus) in a Group of Plantations in Cambodia].—*Bull Soc Path Exot* 1938, June 8 Vol 31 No. 6 pp 457-460

Twenty cases were reported these were scattered about in several villages Clinically there was fever of sudden onset which lasted from 10 to 15 days but neither rash nor primary sore could be detected in any one of the patients. There were three fatal cases with stupor and an extreme degree of wasting Sixteen of the cases showed a positive Weil Felix reaction for *Proteus O\A* negative for *O\19* All the patients were male coolies engaged in clearing scrub in the forest regions, there were no cases in women or children who remained in the villages The cases occurred during the rainy season when the low country was flooded and the rodent population were driven up into the higher forest country where the men were working D H

BLANC (G) GOIRAN (E) & BALTAZARD (M) Observation de deux cas de fièvre boutonnaire à Conakry (Guinée française) et découverte chez les rhinocéphales de la région du chalcidien parasite *Hunterellus hookeri* [Two Cases of Boutonnaire Fever observed at Conakry in French West Africa, Guinea Coast].—*Bull Soc Path Exot* 1938 Jan. 12, Vol 31 No 1 pp 23-28. With 1 chart [16 refs]

These cases, although they occurred in West Africa derived the infection from a dog which had been brought by ship by one of the patients from Marseilles

The first case was that of the wife of a Government official who had arrived in the country 10 days before she became ill This lady had brought with her from France a pet dog and this dog had been housed with other dogs on the ship and had not been seen by the owner till arrival at Conakry The illness was typical of boutonnaire fever with primary sore profuse rash and negative Weil-Felix reaction. Almost on the same day and hour the husband was taken ill with precisely similar symptoms The dog had been allowed to sleep on their bed and several ticks were found on it D H

PELTIER (M) CARRIÈRE (Ch) JOACHÈRE (H) & ARQUIÉ (E.) Premier cas de fièvre boutonnaire au Sénégal [The First Case of Boutonnaire Fever reported in Senegal].—*Bull Soc Path Exot* 1938 Jan 12 Vol 31 No 1 pp 29-32.

Cases of endemic typhus have already been reported in Senegal. In the present case a definite eruption could be felt under the skin although no *tache noire* could be detected joint pains and pains in the neck also pains in the muscles and tenderness on pressure with exaggerated reflexes On the 10th day of the fever the patient's serum agglutinated *Proteus OX19* 1/300 and *Proteus O\2* 1/100 on the 21st day the results were *Proteus OX19* 1/500 and *Proteus O\2* 1/2000 in contrast with two cases of endemic typhus in which *O\19* was agglutinated 1/50 000 and *O\2* only in 1/200

Animals inoculated developed slight fever without orchitis. The pet dog belonging to the patient was infested with numerous Rhipicephalus ticks this dog had never been away from Senegal.

D H

DRBOHLAV (Jaroslav) Le typhus exanthématique en Tchécoslovaquie. [Typhus in Czechoslovakia.]—*Bull. Office Internat. d'Hyg. Publique* 1938 Feb Vol. 30 No 2. pp 317-325 With 3 figs.

During the years following the great war 1920-23 there were numerous cases all over the country. From 1924 to 1933 no cases occurred in the western areas of Bohemia. Cases were confined to the areas bordering on Poland i.e. Slovakia and Sub-Carpathia.

During 1934-37 vaccination by means of Weigl vaccine was carried out in these infected areas and now only sporadic cases are met with both sides. In order to carry out the campaign against typhus a motor steam disinfector and ambulance tour the districts with a doctor and trained personnel cases are removed to hospital and contacts disinfested. Schools are provided with sprays and children are educated in lousing.

D H

ALAIN (M) & DELBOVE (P) Sur quelques cas de fièvre exanthématique avec ulcère primaire observés en Indochine méridionale [Some Cases of Fever of the Typhus Group with Primary Sore observed in Indo-China.]—*Bull. Soc. Path. Exot.* 1938 June 8 Vol. 31 No 6 pp 453-456

These four cases were all in Europeans and occurred during the rainy season. Three gave a positive Weil Felix reaction with *Proteus* OXK.

The first was a very severe case with a marked primary sore and inflamed lymphatics and glands. The other three were milder cases but all showed the typical primary sore and a generalized maculopapular rash.

Guinea-pigs were inoculated with the blood of one patient taken at the height of fever and developed fever but no scrotal reaction. The author is of opinion that these cases are closely allied to Japanese river fever.

D H

RAYNAL (J) Note préliminaire sur le typhus exanthématique à Changhaï (Concession Française) [A Preliminary Note on Typhus in Shanghai (French Concession)]—*Bull. Soc. Path. Exot.* 1938 Apr 6 Vol. 31 No 4 pp 256-258

Louse-borne relapsing fever is frequently met with in Shanghai. Recently a case of fever was seen in a European. A definite typhus rash developed and when the Weil Felix reaction was tested a positive reaction for *Proteus* OX19 was obtained. Following on this case 13 other cases have been met with in which the Weil Felix reaction was positive. All these cases occurred during the winter in conjunction with relapsing fever cases and are probably louse-borne. No virus has yet been isolated.

(1971)

D H

GERMAIN (A) & MORVAN (A) Un cas de fièvre exanthématique à Lorient. [A Case of Fever of the Typhus Group at Lorient].—*Bull Soc Path Exot* 1938. June 8. Vol. 31 No. 6. pp. 503-514 With 1 chart.

A sailor employed on a fishery guard vessel on the Brittany coast developed fever on return from leave at Lille. He passed through a typical attack of fever with rash but without any primary sore. His serum gave a positive Weil Felix reaction but in low dilutions for *Proteus* OX2 and OX19. None of the other men on the ship was ill and none gave a positive reaction. The interesting point is that so far no cases of bontommense fever have been reported from the Atlantic coast of France except one or two imported cases on ships of war visiting Brest from the Mediterranean. This man had not been away from his ship except for the short leave to his home for many months.

D H

LE CHUITON (F) PIROT (R.) BERGE (Ch.) & PENNANZAC'H (J) La voie digestive dans la transmission du typhus murin à bord des bâtiments de guerre. [The Digestive Route in the Transmission of Murine Typhus on Board Ships of War in Toulon Harbour].—*Bull. Acad Méd* 1938. Feb. 8. 102nd Year 3rd Ser Vol. 119 No. 6. pp. 175-178.

The authors note that it has been proved that the virus of typhus may be present in the urine of rats and that this virus is viable on food stuffs contaminated with infected urine for at least 48 hours.

They point out that most of the cases on the ships occur at the season when flies are least numerous. Also examination of patients has not shown any evidence of flea bites. No cases have so far occurred among officers. The authors explain this by the fact that the food of the officers, especially the bread, is carefully stored and is not accessible to rats, whereas the bread eaten by the men is distributed to individuals and often left lying about on the tween decks and attracts the rats.

The authors are now of opinion that the majority of the cases are due to the eating of bread which has been contaminated by the urine of infected rats. Acting on this supposition the authors introduced a system of careful storage of foodstuffs so that contamination could not take place. These food cupboards were installed in August 1936 and a remarkable fall in the number of cases has since occurred. Previously rat destruction was relied on but this was abandoned when the food stores were supplied. Up to 1935 there were usually 20 to 30 cases per annum on the 3 ships in the harbour. In 1935 there were 34 cases, in 1937 only 4 cases were detected.

D H

BRIGHAM (George D) & DYER (R. E.) Endemic Typhus Fever in Native Rodents.—*Jl Amer Med Assoc* 1938. Jan. 15 Vol. 110 No. 3 pp. 180-183 [33 refs]

This paper reviews the subject of endemic typhus in the south eastern parts of the United States. The incidence of the disease has undoubtedly increased and there is a tendency to a spread of the disease from the original foci in towns out into the surrounding rural area.

The possibility of other rodents than the rat serving as reservoirs of the disease is put forward. Eight species of animals chiefly rodents common in the typhus infected areas of the United States have been shown to be susceptible to the virus. These included opossums various species of field mice rats and the flying squirrel. In addition to this the authors have examined mice and rats caught in the rural areas of Alabama and succeeded in isolating a virus of endemic typhus from a field mouse

D H

CHUNG (Huei Lan) & CHANG (Joseph H M) Studies on the Etiology of Typhus Fever in North China.—*Chinese Med J* 1933. June Vol. 53 No 6 pp 513-538 With 2 text figs. & 4 plates [28 refs]

Among 50 000 patients admitted during recent years to the Union Medical College Hospital in Peiping 450 were diagnosed as typhus. Three or four Weil Felix tests were carried out on each case and a high percentage gave positive results with *Proteus O\19* in a dilution of 1280. Careful post-mortem examinations were carried out on 10 fatal cases. Typhus nodules in the brains of all these cases were found in large numbers. The fever in these cases of typhus lasted on an average 2 weeks and the mortality was 10 per cent.

The present paper deals particularly with one case which was studied in detail. The patient was a young man who was admitted to hospital from a poorhouse where the residents (160) were destitute ill-fed and louse-infested. Forty people were reported to have died in this house from fever probably typhus and relapsing fever. This patient had a severe fever lasting 19 days with stupor and delirium. The crisis occurred on the 18th day. The Weil Felix reaction tested on the 7th day of fever was negative on the 12th day it was positive for *Proteus O\19* in 1/320 three days later in a dilution of 1/1280. On this date the serum also agglutinated an emulsion of *Rickettsia prowazekii*. Guinea-pigs inoculated with the blood of the patient developed fever but no orchitis. The serum of these animals agglutinated an emulsion of *Rickettsia*. Body lice which were numerous were collected from the clothing of the patient on the 7th day of the fever emulsified and injected intraperitoneally into guinea-pigs these also developed fever after the usual incubation period. Clean laboratory bred lice were fed on the patient 16 days later the majority were found to be heavily infected with *Rickettsia*. Some of these were injected into guinea-pigs and fever resulted. This virus was readily passed through a series of guinea-pigs. Lice which had been fed on the patient were later fed on the skin of a guinea-pig this animal also became infected. Laboratory bred lice were inoculated intrarectally with emulsion of brain of a guinea-pig infected with the virus isolated from the patient. Numerous *Rickettsia* were found in these lice from the fifth day onward. Sections were prepared from these lice and stained. The intracellular position of the *Rickettsia* was clearly demonstrated in such sections epithelial cells of the intestine of the lice contained masses of *Rickettsia* and some of these were seen separated in the lumen. Twenty five guinea-pigs were infected with this virus of these 16 were males none of these showed orchitis nor was any fever noted in



white rats inoculated. Typhus nodes were few and far between in the brains of infected experimental animals.

Except for this last observation all the evidence points to the fact that the virus under investigation was a true epidemic or historical typhus virus and not a murine virus. D H

ZIMMER (Hans) WEI (H) & FITZPATRICK (Florence) Further Studies of Agar-Slant Tissue Cultures of Typhus Rickettsiae—*Proc Soc Experim Biol & Med* 1938 Mar Vol 38 No 2 pp 285-288 With 2 figs.

Certain modifications of the method have been found advisable. The agar for the cultures is now prepared as follows 150 cc of Tyrode solution double strength is added to 150 cc of normal horse serum and 150 cc 4 per cent agar in distilled water Phenol red is added as indicator reaction pH 7.4 to 7.6 The tissue employed is mouse embryo and is mixed with infected tissue in large tubes and then run over the surface of the agar tubes

Employing this culture medium large quantities of Rickettsia are obtained and these cultures are suitable for preparation of vaccines with the human typhus virus D H

BARYKINE (V) in collaboration with A. KOMPANEETZ A. BOTCHAROWA & H. BAUER Nouvelle méthode de culture du virus du typhus évanthématique. [A New Method of Culture of the Virus of Typhus.]—*Bull Office Internat d'Hyg Publique* 1938 Feb Vol 30 No 2 pp 328-331 With 4 figs.

Fertilized eggs are incubated at 39°C for 3 days the infective material 0.1 cc (brain of infected animal) is injected into the yolk of the egg close to the embryo the eggs are then incubated at a temperature of 32°C for 7 to 8 days. Employing this method the author claims that very large amounts of virus in increasing quantity are produced also the method is easy to carry out. D H

KASAHARA (Shiro) YOSHIDA (Shiruo) & OKAMOTO (Yutaka) Filtration Experiments of the Virus of Endemic Typhus.—*Kiussato Arch Experim Med* 1938 Apr Vol 15 No 2 pp 143-161 [24 refs]

The materials used in these experiments were the tissue cultures from guinea-pigs infected with the virus of murine typhus and emulsions of the organs of infected animals These cultures and emulsions were diluted in Ringer's solution, then centrifuged and the supernatant fluid was filtered through Berkefeld filters Four new and five old filters were employed and filtration lasted 2 to 30 minutes under a negative pressure of 200 mm of mercury After filtration 2 cc. of the filtrate were inoculated into the testicle of a rabbit and after one week the animal was killed and the testicle emulsified and inoculated into the testicle of a second rabbit and intraperitoneally into two rabbits This was continued in series The idea being that the amount of virus which passes the filter is so small that it fails to infect directly but can be multiplied by passage through the testicle of rabbits and can then be demonstrated

Gumepigs inoculated from the 1st 2nd and 4th generation of rabbits became infected and showed typical symptoms of infection fever and scrotal swelling and Rickettsia were found in smears from the tunica. This demonstration of Rickettsia is regarded by the author as the definite evidence of the passage of the virus through the filter. Filtrate of the infected rabbit testicle was also inoculated intraperitoneally into mice and passed in these animals at the 6th generation. Rickettsia could be demonstrated in the mice

D H

DELBOVE & NGUYEN VAN HUONG. Note au sujet d'un virus de typhus tropical isolé à Saigon. Infection expérimentale du cobaye [Note on the Subject of a Virus of Tropical (Scrub) Typhus Isolated in Saigon].—*Bull Soc Path Exot* 1938 Feb 9 Vol 31 No 2 pp 86-89

Gumepigs inoculated with this virus developed fever but none died. All the gumepigs lost weight to a marked degree at least 50 per cent. of the animals died. At post mortem ascites and leucal effusion were noted in the experimental animals and Rickettsia were seen in large mononuclear cells. Twenty-one of the pigs which recovered from the effects of the inoculation were killed with the Pekin typhus virus none was immune. The authors are of opinion that the effects of the inoculation of the Saigon virus resemble those produced by Rocky Mountain fever virus rather than the virus of Tsutsugamushi fever

D H

WU (Chao-jen) & ZIA (Samuel H). Experimental Study of Typhus Viruses from Peking and their Cross Immunity with the Mexican Strain.—*Chinese Med J* 1938 Mar Supp No 2 pp 221-226 With 1 chart.

The strains of Rickettsia isolated from the typhus patients in the Peking Union Medical College Hospital were found to be of two types. One of them gave typical scrotal swelling in gumepigs with Rickettsia bodies easily found in tunica material. The other showed no such swelling. The scrotal swelling produced by the local and the Mexican strains disappeared after a number of passages in male gumepigs. The typhus nodules are regularly present in the brains of guinea pigs infected with those strains causing no scrotal swelling while only sparingly found in those infected with strains which caused such swelling. Cross immunity tests demonstrate complete protection between the Mexican and the local strains which caused scrotal swelling but incomplete protection with those causing no swelling. It seems justifiable to conclude that there are two types of typhus Rickettsia in Peking and neighbourhood one resembling the endemic and the other the epidemic type

D H

BLANC (Georges) & BALTARZARD (M). Réceptivité comparée du cobaye et de l'homme au virus du typhus murin. [Comparative Susceptibility of Guinea-pig and Man to the Virus of Murine Typhus].—*C R Soc Biol* 1938. Vol 128 No 21 pp 733-735

The virus in the faeces of lice was utilized. It was found that this virus can be kept in the dried state for 4 months at least and can be accurately weighed and a series of comparative tests carried out.

The return to normal was noted on the 14th day. There was a slight relative increase of the polymuclear leucocytes.

Agglutinins for *Proteus* OX19 appeared on the 10th day and reached a maximum on the 14th day in a dilution of 1/1600. *Proteus* OX2 and OXA were not agglutinated.

Compared with tick bite fever the incubation period was similar but the true primary sore was not observed although a primary reaction at the needle entry occurred.

The fever lasted longer than is the rule in tick bite fever and the illness was much more severe. also *Proteus* OX19 only was agglutinated

D H

GRAY (J D Allan) PETERS (B A) & DAVIES (I G) An Investigation of a Case of Typhus Fever—*Lancet* 1938 Feb 26 pp 490-491 [11 refs]

This patient, a man of 48 was suddenly taken ill (collapsed) on returning from his work in the sack warehouse of a flour and oil cake mill in Bristol on November 8th. He was admitted to hospital on November 14th and his case was most carefully and thoroughly investigated. Clinically the case was one of sporadic typhus with fever rash in crops and later petechiae also pain in the muscles of the leg. Blood cultures were carried out but neither *Proteus* nor other bacteria could be isolated.

The Weil Felix reaction showed marked positive agglutination for *Proteus* OX19 and negative for *Proteus* OXA. There was no history of any other cases either in the patient's own family or among his fellow workers. The last case of typhus in Bristol was reported 10 years ago. Rats were captured near the mill and examined but no typhus virus could be isolated. [It would be interesting to know if the man had any food while at his work and whether contamination of this food by the urine of rats was a possibility see paper by LE CHUTTON *et al* above]

D H

OLMER (D) & OLMER (J) Fièvre boutonnaise hivernale [A Case of Boutonnaise Fever which occurred in Winter]—*Bull Soc Path Exot* 1938 Apr 6 Vol 31 No 4 pp 265-268.

Practically all the cases of boutonnaise fever which have been reported in Marseilles and the neighbourhood occur during the summer months April to September. However the case recorded in this paper occurred in February 1938. The rash was typical and there was a definite *tache noire* on the cheek of the patient. The Weil Felix reaction tested on the 10th day of the fever was negative. It is noted that the patient complained that the apartment in which he lived was over-heated.

D H

RAGNOT (Ch) DELBOVE (P) ALAIN (N) & CANET (J) Note au sujet des typhus dits tropicaux, observés en Indochine méridionale. Caracteres particuliers, place nosologique [A Note on the Subject of "Tropical Typhus" in Indo-China, its Particular Characteristics and Place in the Nosology]—*Bull Soc Path Exot* 1938 June 8 Vol 31 No 6 pp 460-461

There are two types of the fever met with in Indo-China. (1) met with in Europeans planters or hunters symptoms fever pain in back,

insomnia injection of conjunctivae primary sore with inflamed glands and lymphatics maculo-papular rash involving palms and soles (2) met with in coolies employed in clearing scrub Similar clinically but no rash or primary sore detected.

Both types occur in the rainy season in rural areas and in forest regions. In both types the Weil Felix reaction is positive for *Proteus* OAA but negative for OA19. The disease is neither endemic typhus nor louse-borne typhus.

The viruses of the two types give identical reactions in gumeapies severe infection often fatal comparable to infection with Rocky Mountain fever virus or the virus of São Paulo fever. The authors are of opinion that these types of fever are identical on epidemiological serological and experimental grounds.

D H

RAYBAUD (A) Tache noire et fièvre boutonneuse sans boutons. [Boutonneuse Fever with Tache Noire but without the Rash. — *Marseille Méd* 1937 Nov 5-15 Vol. 74 No 31-32. pp 431-434]

Three typical cases of fever with profuse rash and typical primary sore were noted. The wife of one of these patients developed fever on the same day as her husband. Two typical sores were noted but at no time could any rash be seen. A similar case had previously been seen by the author but as this case was not associated with other cases it was not reported at the time.

D H

GOURIOU (E) MONDOU (H) MARÇON (H) & LAHILLONNE (P) Un cas de phlébite du membre inférieur au cours du typhus endémique bénin. [A Case of Phlebitis of the Lower Limb in the Course of Endemic Typhus. — *Bull Soc Path Exot* 1938 May 11 Vol 31 No 5 pp 335-336]

On the 20th day after the fever started and some days after the temperature had become normal phlebitis of veins of the left lower limb developed with swelling and pain slight oedema and fever. Four months later the patient was discharged from hospital still with marked oedema of the limb. Six months later the condition still persisted.

So far as the authors are aware this is the first case of its kind so far published although a number of instances of this condition in boutonneuse fever have been reported.

D H

VIOLLE (Henri) Contribution à l'étude des typhus exanthématiques endémiques. [A Contribution to the Study of Endemic Typhus. — *C R. Acad Sci* 1938. Jan. 31 Vol. 206 No 5 pp 382-383]

Two rickettsial diseases are met with on the coasts of the Mediterranean. The one boutonneuse fever carried by the dog tick the other ship typhus carried by the rat flea. These two diseases clinically resemble one another closely although there are differences in the rash and the primary sore is present in most cases of boutonneuse fever although not in all. As regards the Weil Felix reaction in endemic typhus *Proteus* OA19 is mainly agglutinated whereas this occurs as a doubtful or group reaction in boutonneuse fever. Even cross immunity tests may fail at times to separate the two viruses. The author had in hand strains of the two viruses and carried out a

series of experiments with these on rabbits. He found that if rabbits are inoculated with the virus of boutonneuse fever this virus can be shown to be viable in the brains of these animals after 4½ months and in the blood up to 2 months. The same or similar results were obtained when the virus of endemic typhus was employed in neither case was there any fever or other symptom of infection in the rabbits. It was also found that pups could be infected with the virus of endemic typhus and rats with the virus of boutonneuse fever if the digestive route was employed. This might be described as a cross infection, since the dog is the reservoir of the virus of boutonneuse fever in nature and the rat the reservoir of the virus of endemic typhus. D H

LOGOTHETIS (E) KASTANAKI (E) & KASTANAKI (G) Sur les méthodes biologiques du diagnostic de la fièvre exanthématique (fièvre boutonneuse, fièvre maculo-papuleuse) [Biological Measures for the Diagnosis of Boutonneuse Fever]—*Bull Soc Path Exot* 1938, May 11 Vol 31 No 5 pp 329-335

The first part of this paper consists of a description of the disease and a history of the discovery of the vector.

A case was admitted to hospital under care of the authors. Weill-Felix positive 1/200. Blood from the patient was inoculated intraperitoneally into a guinea pig. This animal developed fever and orchitis and a primary sore was noted at the point where the needle had penetrated the skin. The virus was passaged to several animals.

An emulsion of virus which had been heated for 30 minutes at 56°C. when injected into the skin of the patient produced no reaction but when injected into the skin of a normal person a reaction appeared. Emulsion of the brain of an infected guinea pig mixed with the serum of the patient and injected into the skin of rabbits and guinea pigs intradermally produced no results but when mixed with normal serum a reaction appeared.

Rickettsia were found in smears from the organs of guinea pigs infected with the virus. Ticks were collected in the patient's house and from his dogs and emulsified and injected into guinea pigs and fever resulted whereas ticks collected from an adjoining house did not infect. D H

GIROUD (Paul) Essai de mise en évidence des anticorps du typhus exanthématique par un test cutané [A Skin Test in Typhus].—*C R Soc Biol* 1938, Vol 127 No 5 pp. 397-399

The sera of cases or of persons who have recently recovered are taken and mixed with a definite dose of virus. This mixture is held for 30 minutes then injected into the skin on the inner side of the thigh of the rabbit. A mixture of normal human serum with the same dose of virus is injected into the other side. If the patient has, or has recently had, typhus the virus will be neutralized and no reaction will appear whereas at the site of the injection of the virus and normal serum a marked reaction occurs.

This test can be used not only as an aid in diagnosis but also as a means of demonstrating the presence in the blood of antibodies for typhus. D H

GIROUD (Paul) Variations de la virulence des organes et des cultures du virus typhique murin mises en évidence dans la peau [Variation of Virulence of the Organs of Infected Animals and Cultures of Typhus Virus as evidenced by a Skin Reaction.]—*C R Soc Biol* 1938 Vol. 127 No 10 pp 864-866

This skin reaction can be used not only for the diagnosis of typhus but also for estimating the titre of antisera.

Emulsions of the organs of infected animals and cultures of typhus virus were kept at low temperatures and injected intradermally into the skin of rabbits. It was found that emulsion of tunica of infected guineapigs taken on the 6th day and injected produced a very definite nodule on the skin of the rabbit from the 4th to the 9th day after inoculation in dilutions of 1/250 to 1/2000. Emulsions of spleen brain or testicle taken at the same time did not produce any reaction even in a dilution of 1/25. The tunica apparently contains 10 times more virus than other organs.

Two strains of virus were tested one from America and one from Morocco. These were found to be about equal as regards reaction in the skin. If the animals were given a diet lacking in Vitamin C the reaction was more marked. Cultures of virus do not give as marked reactions as do emulsions of passage virus. D H

GIROUD (Paul) Réaction provoquée par l'inoculation dermique du mélange de virus typhique exanthématique et de sérum d'individu ayant reçu un antigène de ce groupe. [Reaction produced by the Intradermal Injection of a Mixture of Typhus Virus and of the Serum of an Individual who has received an Antigen of the Group]—*C R Soc Biol* 1938 Vol. 128 No 17 pp 249-252

When the serum of people who have had typhus is mixed with typhus virus (murine) and injected intradermally no reaction appears but with normal serum there is a marked reaction.

One would expect that when the serum of individuals who have had injections of killed virus is mixed with living virus and injected the virus would be neutralized and no reaction appear but on the contrary a more severe reaction results than that on the control side even.

The effect of the serum of people who have had inoculations is different from that of people who have had typhus possibly the antibodies produced are different and there is a sensitization. D H

GIROUD (P) Les anticorps des infections exanthématiques. Le test de séro-protection cutanée locale [Estimation of the Antibodies in the Blood in Cases of Typhus Fever by Means of a Skin Test.]—*Bull Soc Path Exot* 1938 Apr 6 Vol. 31 No 4 pp 245-252. With 5 figs. [11 refs.]

The method employed is that varying doses of infective material (emulsion of tunica of infected guineapig) are mixed with the serum under test and kept at room temperature for 15 minutes then injected into the skin of guineapigs or rabbits (white preferred). The viruses used in these trials were murine virus (Zinsser) and murine virus Tunis No 1. It was found that even 1/2000 of the emulsion of an infected tunica would give a reaction in the skin in rabbits. The sera of typhus cases also convalescent sera and the sera of people who had

had typhus some years previously were tested and it was found that these sera neutralized the virus and no reaction appeared, whereas controls in which the virus was diluted with normal saline or normal serum gave a marked reaction. This reaction appeared on the 4th day in the form of erythematous nodules going on in some cases to necrosis. It is proposed to utilize this method for the diagnosis of cases of typhus and for the detection of immunity in vaccinated persons. *D H*

OCHI (Sadami) A Method for staining Rickettsia in Sections.—*Jl Lab & Clin Med* 1938 May Vol. 23 No 8. pp 852-856.  
With 2 figs

The author considers that when studying Rickettsia in experimental animals sections of tissue as well as smears should always be employed. He recommends his method for staining trachoma, as follows —

*Fixatives* Schaudinn's sublimate alcohol  
or 1 per cent. formalin in distilled water  
Embed in paraffin.

<i>Staining solution</i>	Kresylechtviolet (Grübler)	0.5
	Glycerin	10.0
	5 per cent. carbolic	80.0
	Distilled water	100.0

For sublimate alcohol sections.

For formalin fixed sections the distilled water is omitted.

The sections are stained section side down for 20 minutes. Sections are then first washed in distilled water then in 5 per cent. acetic acid water for 1 minute sections are then dried, cleared in amlin xylol then xylol and mounted in neutral Canada balsam. In stained sections Rickettsia within the cells can be clearly seen, also any pathological changes in the tissues can be observed. *D H*

GROUD (Paul) & TANNENBAUM (Simon) Le comportement du cobaye typhique exanthématique vis-à-vis de la réaction de Weil et Felix peut il éclairer la pathogénie de cette réaction? [Weil-Felix Reaction in Guinea-pigs Infected with Typhus].—*Arch Inst Pasteur de Tunis* 1937 Dec Vol 26 No 4 pp. 671-675.

It is well known that in guinea-pigs infected with typhus the Weil-Felix reaction is negative whereas in man, monkeys and rabbits the reaction is positive.

During typhus fever passage of bacteria takes place from the intestine to the blood and lymph streams and *Proteus* has been frequently isolated from the blood in typhus fever and also in fevers other than typhus. The authors have made careful surveys of the bacterial flora of the intestine of guinea-pigs and have failed to find *Proteus*.

The following experiments were carried out. Six guinea-pigs were fed on *Bact. coli* by mouth and per rectum and were then infected with typhus the Weil-Felix reaction did not become positive. Ten guinea-pigs were fed on *Proteus* but not infected with typhus the Weil-Felix reaction remained negative. Eight guinea-pigs were fed on *Proteus* and were infected with various strains of typhus virus. All gave a positive Weil-Felix reaction for *Proteus* OX19 and OX1 but did not agglutinate *Proteus* OX2 or OXK. If the typhus infection

was delayed till the *Proteus* bacilli had disappeared from the intestine of the guinea-pigs the reaction did not become positive. If there are no *Proteus* in the intestine there can be no passage of this bacillus into the blood and no positive Weil Felix reaction.

In the opinion of the authors the Weil Felix reaction is not due to an immunological relation between *Proteus* V and Rickettsia but is a secondary reaction due to invasion of the circulation by a commensal germ.

D H

GAUD. La vaccination contre le typhus par la méthode de G. Blanc au cours de l'épidémie de 1937 au Maroc. [Vaccination against Typhus by the Method of G. Blanc in the Course of the Epidemic of 1937 in Morocco.—*Bull. Office Internat. d'Hyg. Publique* 1938 Feb. Vol. 30 No. 2 pp. 298-307. With 3 charts and 1 map.]

In Morocco there was a big epidemic of typhus in 1927 and 1928 but since then only a few cases have occurred each year until 1937.

Year	Cases	Year	Cases
1927	1 659	1932	236
1928	4 132	1933	451
1929	147	1934	303
1930	170	1935	431
1931	403	1936	173

In 1937 the economic situation in N. Africa was grave and many cases of typhus were reported from Tunis and Algeria. The epidemic in Morocco commenced in March and by the middle of May when it reached its peak 100 cases were reported in a week. There were three principal foci of the disease: one rural in Marakeesh and two in the cities of Fez and Casablanca. Most of these cases occurred among the refugees from the countryside where crops had failed. All the people were starving and lice infested. Some 50 000 people were vaccinated at the market town of Rehamna situated at the junction of two great caravan routes.

In Fez some 3 000 people were vaccinated, including 800 in an institution where the refugees were lodged and where typhus had broken out. No further cases occurred among them.

In Casablanca where there was a native population of nearly 200 000 136 000 were vaccinated in one month and all voluntarily. Seventy cases were reported on 15th May and none after 29th June. No severe reactions were noted or reported among the vaccinated. Slight fever 1 to 3 days was noted in a few of the Europeans inoculated.

D H

RADLO (Pierre). Observations sur la vaccination contre le typhus exanthématique par le vaccin de Weigl. [Observations on Vaccination against Typhus by Weigl Vaccine.]—*Arch. Inst. Pasteur de Tunis* 1937 Dec. Vol. 26 No. 4 pp. 667-670.

This vaccine is a killed vaccine and has been in great demand recently. It is difficult to prepare in large quantities as it entails lice breeding on a large scale inoculation and dissection of lice etc.



At present in the Institute at Lwow it is possible to prepare only about 2,000 doses in a month, the numbers of lice intestines per dose has been reduced from 250 to 150 and now to about 90 per person this amount being given in 2 or 3 doses.

In the four years 1933-36 experiments were carried out near Lwow when nearly 14 000 persons were inoculated. It has been estimated that in infected lice there will be from 10 million to 100 million *Rickettsia* in the intestines. The mixture of these intestines will give on the average 5 000 000 000 *Rickettsia* in a dose of 90 intestines. This would be given in three doses. In the trials of the 14 000 vaccinated

One-quarter received contents of 1 to 10 intestines.

One-half " " " 10 " 20 " "

One-quarter " " " 20 90 " "

No difference so far as protection was concerned was noted between those receiving the large dose and those receiving the smaller doses. Also it is not necessary to inoculate the entire population to check an epidemic. 30 per cent. is sufficient and these should receive contents of 10 to 20 intestines in three doses. D H

LAIGRET (Jean) DURAND (Roger) BELFORT (Joseph) & LEFAUCHEUR (Jean). La vaccination contre le typhus évanthématique en Tunisie [Vaccination against Typhus in Tunisia].—*Bull. Office Internat. d'Hyg. Publique* 1938 Feb Vol. 30 No. 2 pp 303-316

A living vaccine was used, the endemic typhus virus being dried and suspended in yolk of egg and finally in olive oil. Approximately 1/200 of the brain of an infected rat is injected in each dose.

The present investigation deals with the results obtained in the 30 000 people who had been inoculated in the previous year (1936). These people were mostly in the areas where typhus existed. Three cases of definite "vaccinal typhus" occurred among these people. These were all Europeans; no case occurred among the vaccinated Arabs. Three cases of true typhus occurred among these 30 000 vaccinated people more than one month after vaccination; there were no deaths. There have been no further cases in the vaccinated during 1937 and cases that have occurred in partially protected villages have all been in the unvaccinated. The three chief points in the campaign are isolation of the sick, lousing of contacts and above all but in combination with the two first—vaccination. The great advantage of vaccination is that quarantine can be reduced or eliminated, markets can be held and people can continue or resume their work. See also *Bulletin of Hygiene* 1938, Vol 13 p 712.] D H

SPARROW (Hélène) & MARESCAL (P). Essais d'immunisation de l'homme par voie oculaire avec les rickettsies du virus murin I de Tunis. Attempts to Immunize Men by the Virus of Rat Typhus No. 1 of Tunis by the Ocular Route.]—*Bull. Acad. V.M.* 1938 Jan 25 102nd Year 3rd Ser Vol 119 No 4 pp 140-145 With 6 h<sub>6</sub>.

The opportunity was taken for this work during the treatment of cases of dementia praecox by fever therapy.

The authors have already noted that if guineapigs are inoculated with this virus by the peritoneal route a severe infection results whereas if the virus is instilled on the conjunctiva the infection is inapparent yet immunity follows. Lice were inoculated according to the Weigl technique and emulsion made of infected intestines containing numerous *Rickettsia*. One drop was placed on the conjunctiva of the patient. Five men in all were inoculated all developed fever after an incubation of exactly 15 days. The fever was mild there was no rash and no other symptoms the Weil Felix reaction became positive early and gave reactions up to 1/10 000. These five men were re-tested later. All proved to be immune. One control not previously inoculated developed a mild fever after an incubation period of 18 days.

D H

KLIGLER (I J) & LEVINE (Sonia) Immunization of Monkeys and Humans with Formolized Tissue Cultures of Typhus *Rickettsia*.—*Trans Roy Soc Trop Med & Hyg* 1938. June 25 Vol. 32. No 1 pp 93-98 With 1 graph

Two-week-old cultures were employed in these experiments and the triturated tissue was suspended in saline solution instead of the original culture fluid. Three injections 0.5 cc. of the formolized cultures were given at intervals of three days to monkeys and the animals were tested two weeks later by injections of living virus. Ten monkeys were injected and when tested later only two of these had slight fever two controls on the other hand developed typical temperatures. The monkeys showed a rise in the Weil Felix reaction after vaccination but there was no response on the injection of living virus.

Six laboratory workers were vaccinated with killed cultures. Two of these showed a marked positive Weil Felix reaction before vaccination these two had been employed in handling typhus material for some years in the laboratory. The other four developed a positive reaction after vaccination. Apart from a mild local induration and reddening no discomfort was experienced and there was no rise in temperature.

D H

WEIGL (R.) La sérovaccination de l'homme contre le typhus. [Serovaccination of Man against Typhus].—*Arch Inst Pasteur de Tunis* 1937 Dec Vol. 26 No 4 pp 665-666

The serum of convalescents if mixed with virus can prevent infection in experimental animals. Vaccines given during the incubation period of typhus do not prevent the development of the fever. If the serum of convalescents is given during the incubation period fever is prevented and immunity due to the vaccine has time to develop. Contacts may be protected in the same way. As convalescent serum may be difficult to obtain the author suggests the use of the serum of recently vaccinated people. Experimentally these sera are as good or better for the purpose than convalescent sera.

D H

BALTAZARD (M.) Etude d'un sero-test d'immunité dans les fièvres exanthématiques. [A Study of a Serological Test for Immunity in Typhus Fevers].—*Bull Soc Path Exot* 1938 Mar 9 Vol. 31 No 3 pp 186-192. With 1 chart. [17 refs.]

A review of previous work is first given, and it has been shown by NICOLLE that the serum of persons recovered from typhus when mixed

with virus prevented the infection of experimental animals as did the serum if injected before the virus.

The author has already published work which showed that the inoculation of the viruses of murine typhus and of boutonneuse fever into the skin of rabbits and guinea-pigs produces a local reaction which appears in 48 hours. He also showed that if the virus is first treated with bile no reaction results whereas the virus alone injected at the same time on the other side produces the typical reaction. Emulsion of the spleen of infected guinea-pigs was used and definite doses of this were mixed with varying amounts of serum. These mixtures were kept at room temperature for 15 minutes and then inoculated into the left flank of guinea-pigs, while into the right flank the same dose of virus without serum was inoculated. The two reactions were then compared and contrasted.

The reactions were uniform on the control side and varied on the other side according to the amount of immune serum employed. Without the controls with which to compare the test serum it is difficult to read the results owing to the differing susceptibility of guinea-pigs.

As the viruses of Rocky Mountain fever and of typhus do not produce a local reaction in the skin of animals the sera of persons with Rocky Mountain fever can be tested with the virus of boutonneuse fever and the sera of typhus fever patients tested with the virus of murine typhus. Employing these methods of testing it is possible to determine

- 1 The date at which antibodies appear in the serum of persons suffering from typhus, murine typhus, Rocky Mountain fever and boutonneuse fever.
- 2 Duration of antibodies in the serum of patients and infected animals.
- 3 The length of time antibodies remain active in serum *in vitro*.
- 4 Detection of antibodies in inapparent infections in man and animals.
- 5 Variations in antibodies in vaccinated people due to reinoculation.

*Résumé*—The serum of men or animals cured of typhus or murine typhus prevents the local reaction produced by the murine virus.

The serum of men or animals recovered from boutonneuse fever or Rocky Mountain fever prevents the local reaction produced by boutonneuse virus. Further research is proposed on these lines.

A Discussion followed. M. GIRAUD (see above) pointed out that this work confirms his own findings.

D H

GIRAUD (Paul) La sensibilité cutanée locale vis-à-vis d'un virus typhique murin est inversement proportionnelle à la réceptivité générale de l'organisme. [The Local Skin Reaction to the Virus of Murine Typhus is Inversely proportional to the General Susceptibility]—C R Soc Biol 1938 Vol. 128, No. 20 pp 580-591

Mice when inoculated intraperitoneally with the virus develop high fever and nearly all die yet the local reaction is nil.

White rats have fever but not so severe though some may die but these also do not develop a local reaction in the skin. Guinea-pigs have a still milder fever and do not die of the infection but develop a definite local reaction.

Rabbits have only an inapparent infection when inoculated intraperitoneally but show a marked local reaction when inoculated intradermally  
D H

CASTANEDA (M. RUIZ) & VARGAS-CURIEL (J) Response in the Horse to Mexican Typhus Infection.—*Jl Immunology* 1938 July Vol. 35 No 1 pp 47-54 With 2 figs.

With a view to obtaining a potent antiserum horses were inoculated with living virus. These animals developed fever depression refusal of food and loss of weight. Although it was not possible to isolate the virus from the blood the authors are of opinion that the animals were infected they developed a positive Weil Felix reaction and a second injection of the living virus in the same animals elicited no response. The result of protection experiments with the serum of these animals was disappointing but it is now proposed to super immunize the animals by intensive intravenous treatment with heavy suspensions of formalinized Rickettsiae  
D H

TRAVASSOS (J) Comportement du rat blanc aux inoculations expérimentales sériées du virus du typhus exanthématique de São Paulo [Effects of the Inoculation of the Virus of São Paulo Typhus in the White Rat].—*C. R. Soc Biol* 1938 Vol. 127 No 5 pp 457-459

The virus was passed in series from rat to rat. 5 series were used and a total of 150 rats were inoculated. No fever was noted in any of the rats nor were any signs of infection such as orchitis or enlarged spleen seen at post-mortem examination, no Rickettsia could be discovered in smears from the peritoneum or tunica. The Weil Felix reaction was negative in most. In spite of this it could be shown that the virus multiplied in the blood of the rats. Blood taken on the 10th day after the inoculation infected guinea-pigs but from the 2nd series rats only mild infections were produced and the virus could not be isolated from the rats in the 4th series. A few of the guinea-pigs infected from the 3rd series rats had slight fever but were not immune to reinfection. White rats are strongly resistant to the virus of São Paulo typhus and passage through these animals reduces the virulence for guinea-pigs.  
D H

TRAVASSOS (J) Etudes expérimentales sur la transmission du typhus exanthématique de São Paulo par l'*Amblyomma striatum* Koch 1844 [Transmission of the Virus of São Paulo Typhus by the Dog Tick *Amblyomma striatum* (Koch)].—*C. R. Soc Biol* 1938 Vol. 127 No 5 pp 462-464

Adult ticks were collected from dogs and were fed on infected guinea-pigs and also on normal guinea-pigs to exclude previous infection. Batches of these ticks were fed for periods of 6 hours up to 6 days after 8 days they were then fed on normal guinea-pigs and some were crushed up and injected into the animals. Numerous positive results were obtained. These were confirmed by the reactions in the guinea-pig and the production of positive Weil-Felix reaction in rabbits. Larvae obtained from some of the female ticks were fed on infected rabbits. The larvae became infective and also nymphs and

adults which developed from these larvae. Female ticks were fed on infected rabbits and the eggs collected. These eggs were emulsified and injected into normal guinea-pigs which became infected. D H

TRAVASSOS (J) La tique *Amblyomma striatum* Koch, 1844 comme vecteur du "typhus exanthématique de São Paulo" Infection naturelle en spécimens recueillis sur des chiens, dans un foyer de la capitale (São Paulo) [The Tick *A. striatum* Koch 1844 as a Vector of São Paulo Typhus. Natural Infection in Specimens collected from Dogs in a District of São Paulo.]—C R Soc. Biol. 1938 Vol. 127 No. 13 pp. 1377-1380.

Ticks of the species *Amblyomma striatum* were collected from dogs in a district of the city where cases of typhus had recently occurred. Two series of experiments were carried out and showed that dog ticks were naturally infected and were capable of transmitting the virus by their bite to susceptible animals, and probably also to man. Animals infected with the virus derived from the ticks were immune to the virus from cases of São Paulo typhus and vice versa. D H

TRAVASSOS (J) Transmission expérimentale du "typhus exanthématique de São Paulo" par l'*Amblyomma brasiliense* Aragao 1908. [Experimental Transmission of São Paulo Typhus by the Tick *Amblyomma brasiliense* Aragao, 1908.]—C R Soc. Biol. 1938. Vol. 127 No. 13. pp. 1375-1376

Specimens of ticks were collected from their natural hosts in the bush, tapirs and peccaries. The nymphs of these ticks were then fed on guinea-pigs infected with São Paulo typhus. They were then removed and placed in tubes where they moulted. The adult ticks were taken and fed on normal guinea-pigs and rabbits. After the usual incubation period these became infected and the virus was passaged in guinea-pigs with typical symptoms. The blood of the rabbits was shown to be infective and gave a positive Weil-Felix reaction. These ticks are easily infected with the virus and readily infect experimental animals. D H

VOURY (M) Blocage et infections typhiques. [Results on Typhus Infection of blocking the Reticulo-Endothelial System with Colloids.]—Bull. Soc. Path. Exot. 1938. Feb. 9 Vol. 31 No. 2. pp. 80-82.

These experiments were carried out on guinea-pigs with three strains of virus: (1) Historic typhus (2) Endemic typhus (3) Bouton rouge fever.

As regards typhus virus it was found that the blocking of the system lowered the resistance of the animals and the infection was more severe and lasting than usual. But as regards the other two viruses the results were unexpected. If the inoculation of the virus is done before the injection of the colloid (blocking) the results are similar to the above (lowered resistance) but if the blocking is done first an inapparent infection only results and the animals are resistant to further infection. D H

APPEL. Note concernant la lutte contre le typhus dans le Département de Constantine. [Note concerning the Prevention of Typhus in the Department of Constantine.]—*Rev Méd et Hyg Trop* 1938. Jan.-Feb Vol. 30 No 1 pp 23-31

The author's contention is that the regulations for the control of typhus in the Department are excellent but do not work out successfully in practice and he makes suggestions for improvements. As regards notification of outbreaks rules are laid down for this but these rules are often neglected or ignored by the civil authorities due partly to laziness and partly because these people resent interference from the sanitary department which follows discovery of the disease. He suggests that notification should be carried out by trained inspectors suitably clad and who can be bathed and loused daily such people should be well remunerated. Under the present system outbreaks sometimes assume quite large proportions before notification reaches the medical authorities.

As regards disinfection and delousing the regulations also are good but often difficult to carry out in practice. For instance, steam disinfection and baths and sprays are recommended but cannot be employed, due to lack of water and accommodation on the spot. Also the women cannot be dealt with unless women doctors and attendants are appointed.

The poorer people have only one garment therefore in winter at least it is necessary to carry a reserve of clothing for people to wear while their own garment is being fumigated. As regards disinfection of huts and furniture Flit is preferred to the lime wash at present used.

Isolation of cases and contacts is necessary but as at present carried out is not strict and friends and relations freely mix with the sick and other contacts. Contacts who are supposed to be isolated are found visiting the villages or move about from house to house. The isolation must be strict and for this purpose sectional wooden huts are suggested. These can be carried on lorries and erected where desired, these also could be used for spraying and bathing where water is available. Special zinc lined carts should be provided for transport of sick to such huts such carts can be easily disinfected with sulphur. *D H*

CHI (Ta-Chih) & SU (Der Long) Delousing in Refugee Camps.—*Chinese Med J* 1938 Mar Vol. 53. No 3 pp 271-277 With 10 figs.

Two methods were employed.

1. Ironing and spraying clothes with a mixture of cresol, naphthalene and crude oil.
2. Hot air delouser a wooden box.

The first method was found to take too long and required too much labour. The hot air delouser is preferred this is a wooden box 5 ft. square with a perforated iron sheet as the base under which braziers are placed. The top consists of loose boards and clothes are put in through this. A temperature of 83°C. can be obtained in 15 minutes. Lice and nits are killed in 20 minutes and one squad with two delousers can deal with 1 000 to 1,500 garments in one day. *D H*

JOURNEX (Ch.) Typhus et fièvres exanthématiques. [Typhus and Typhus-like Fevers.]—*Marseille-Méd.* 1837 Sept. 25 Vol. 74 No. 27 pp. 251-260.

A general review of the subject.

D H

HAMPTON (Brock C.) & EURANK (Harry G.) Rocky Mountain Spotted Fever Geographical and Seasonal Prevalence Case Fatality and Preventive Measures.—*Public Health Rep* Wash. 1933. June 17 Vol. 53. No. 24 pp. 984-990. With 1 fig

The disease is discussed from the clinical, geographical and seasonal aspects the latter depending of course on the presence of the tick vectors. Full tables are given from the records in the statistical departments. It is interesting to note that when the fatality rates for the five years 1833-37 are analysed, the number of deaths per 100 cases in the north-western States is 19.4 and the south-eastern States 18.1. In previous years the fatality rate in the western States was much higher the authors consider that the fall in the rate is due to the extensive use in recent years of the preventive vaccine. This vaccine has not been used so far in the eastern States

D H

PARKER (R. R.) Rocky Mountain Spotted Fever—*Jl Amer Med Assoc* 1933 Apr 9 & 16 Vol. 110 Nos 15 & 16. pp 1185-1188 1273-1278

A résumé of present-day knowledge of the disease read before the first Rocky Mountain Medical Conference at Denver on July 21st, 1937

The data are presented under four sectional headings (1) Ticks concerned in the maintenance and transmission of the virus (2) the virus and the disease in nature (3) the disease in man (4) Prophylaxis.

The various papers by the author and by others on which this résumé is founded have been already summarized in this *Bulletin* those specially interested in Rocky Mountain spotted fever should consult this detailed and complete account. As regards the vexed question of the spread of spotted fever from west to east the author points out that cases of spotted fever in the eastern States carried by the American dog tick *D. variabilis* are most numerous in eastern coastal areas, becoming fewer and fewer the further west one goes. Then comes an area where no cases have so far been discovered, and further west districts in which true Rocky Mountain fever cases carried by the American wood tick *D. andersoni* are found these cases become more numerous to the west and north. In all these areas including the districts where the disease in man has not yet been discovered a mild type of the virus can be isolated from the common rabbit tick *H. leporis palustris* this tick does not bite man.

This geographical distribution of the disease is against the view that the virus has been in recent years carried from west to east, as is also the fact that cases are not found along the great trade routes and railroads which run across the Continent. It appears more likely that cases have been occurring in the eastern and central States for many years but have not been detected till a few years ago.

D H

HEALTH NEWS New York, 1937 Oct. 25 Vol 14 No 43  
pp 175-176 Cases of Rocky Mountain Spotted Fever found on Long  
Island. [Summary taken from *Public Health Engineering Abstr*  
Wash 1938 Apr 2 Vol. 18 Signed Earnest BOYCE]

Rocky Mountain spotted fever is now recognized in various parts of the country. This article refers to cases occurring in the eastern part of Long Island from 1926-30 1934 and to report published in September 1935 Journal A.P.H.A. Subsequent to this report four additional cases have occurred in this district with a record of tick bites in two cases. One fatal case. Blood specimens from all cases agglutinated *B. proteus* X19 in high dilution. Seasonal distribution of cases—all late spring or summer.

DIAS (Emmanuel) *Depositaros naturais e transmissores da febre Maculosa brasileira* [Natural Hosts and Vectors of the Spotted Fever of Brazil].—*Brasil Medico* 1938 Mar 12. Vol. 52 No 11 pp 269-272 [26 refs.]

Brazilian spotted fever includes Rocky Mountain spotted fever and the São Paulo and Minas Geraes types of endemic typhus. Natural (reservoir) hosts were stated by MOREIRA and MAGALHÃES in 1937 to be six in number: the opossum *Didelphis marsupialis*, the dog *Canis familiaris*, also *C. brasiliensis*, the wild rabbit *Silvilagus minensis*, the *Cavia aperea* and *Dasyprocta agouti*. TRAVASSOS later the same year noted a natural infection in *Didelphis aurila* and *D. paraguayensis*. From the human aspect the dog is the chief natural host.

As for vectors several genera of ticks have been incriminated. The most important are species of *Amblyomma* viz *A. cajennense* (the chief vector for man) and *A. striatum*. *A. brasiliense* often bites man but it is a natural parasite of wild pig, capybara and tapir which are not known to harbour the virus of spotted fever. Other species of *Amblyomma* may possibly act as vectors, but are not proved to do so.

*Rhipicephalus sanguineus* plays a large part in dissemination of the infection among dogs and may accidentally infect man. *Ixodes* especially *I. loricatus*, *Haemaphysalis leporis palustris* and *Dermacentor andersoni* are transmitters to animals but are not found in Brazil.

H H S

CAREY (Lawrence S.) & DUNCAN (Garfield G.) *Rocky Mountain Spotted Fever in the East. Report of a Case.*—*Jl Amer Med Assoc* 1938 Jan. 15 Vol. 110 No 3 pp 175-177 [15 refs.]

This paper opens with a review of the subject of Rocky Mountain spotted fever generally and specially as it affects the eastern States. The authors point out that this fever was unknown in the East a few years ago. The epidemiology is discussed and the clinical features described. It is noted that the mortality of the disease in the eastern States is much lower than in the original home of the disease in the western States and specially in certain valleys of the Rockies.

The case described was that of a youth aged 16 who went out on a shooting trip. He gave a history of picking off ticks from his dog and crushing them in his fingers.



The fever was high with delirium and a profuse macular rash which appeared first on the limbs, then the chest and spread all over the body. There was a well marked leucocytosis and the Weil-Felix reaction was positive for *Proteus O119* in a dilution of 1/160. The patient recovered and made a rapid convalescence. D H

## DENGUE AND SANDFLY FEVER.

DOCTOR (Kornolios) A Clinical Study of the Present Dengue Epidemic. —*Jl Egyptian Public Health Assoc.* 1938. Jan. 13th Year pp 2-18 With 4 coloured figs. on 2 plates & 15 charts.

A detailed study based on several hundred cases admitted to the hospital in Cairo.

Fever and headache were the two constant symptoms and the only symptoms in a large number of the cases. Muscular pains came next in order of frequency, also joint pains but these were often not recorded. Infection of the conjunctivae was observed in the majority. Numerous temperature charts are shown the types being continuous, saddle back and ascending or descending. Redness of the skin, primary rash was noted in a number of cases and also a later terminal or secondary measles rash. But as already stated a large number of the cases showed neither rash or saddle back chart nor complained of pains.

D Harvey

O'HARA (F J) "Sellar Fever" [Correspondence.]—*Trans. Roy Soc Trop Med & Hyg* 1938. Mar 17 Vol 31 No. 5. pp 671-672.

The writer considers that "Sellar fever" is likely to be confused with dengue which is also a saddle fever. In fact [one gathers] he considers that this confusion has already occurred. That is that sellar fever is really dengue (see this *Bulletin* 1938, Vol. 35 p. 377).

D H

PAPANDONAKIS (E) & AVRILIONIS (D) Remarques sur une épidémie de fièvre de trois jours [Remarks on an Outbreak of Three-Day Fever.]—*Arch d'Hygiène* Athens. 1938 May Vol 2 No. 5 [In Greek pp 131-132. With 5 charts. French summary p 163.]

In Crete in May 1937 a hundred cases of an acute fever were reported. In addition to the fever lasting 4 to 5 days, general malaise, frontal headache and slow pulse were noted. No malarial parasites could be seen in the blood. Of the insects captured in the rooms of the sick, 98 per cent were *Phlebotomus* (80 per cent. of these were *papatasi*) the remaining 2 per cent. were mosquitoes. D H

MOCHKOVSKI (Sh. D.) DIOMINA (N. A.) MALAKHOV (B. J.) PAVLOVA (E. A.) & LIFSCHITZ (J. M.) Recherches sur la fièvre pappataci. Mémoire VII. Expérience de l'immunisation préventive contre la fièvre pappataci [Results of Immunization against Pappataci Fever]—*Med. Parasit. & Parasitic Dis.* Moscow 1937 Vol. 6 No. 6 [In Russian pp. 910-920 With 5 figs. French summary p. 921.]

The method used was to inoculate with serum taken from a case of the fever followed by 3 cc. of immune serum. A few cases of reaction followed. A later method was to use mixtures of serum and immune serum and to inject this. The resulting immunity was similar to that following an attack of the fever.

This method has resulted in a considerable reduction in incidence in 500 people who were treated as compared with a control group un inoculated.

D. H.

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## MALARIA.

SOUTHERN MEDICAL JOURNAL. 1938. Aug. Vol. 31 No. 8 pp. 833-849—Symposium on Malaria—Part 2. [5 papers.]

This contains papers from the National Malaria Committee which held a conference jointly with the Southern Medical Association at New Orleans in November and December 1937. It is the second instalment of the report papers from the first instalment of which are abstracted below [see pp. 803-811 & 812]. In it are summarized papers dealing with recent research on medical prophylaxis and treatment of malaria, advances in the epidemiology of the disease, recent additions to knowledge of immunity, and research on the plasmodia. The first part also contains a summary of methods of mosquito control. These papers are not suitable for further abstracting, but contain well arranged information useful to all workers in that they summarize present knowledge, though containing no fresh information. The fifth paper on *Pi. knowlesi* in general parasites, will be abstracted in the *Bulletin of Hygiene* as it is of greater interest to those engaged in the use of malaria as a therapeutic measure in parasymphylis than to the tropical practitioner. C IV

DOGRA (J. R.) A Malaria Survey of Bannu Cantonment (1932-33) — *Jl. Malaria Inst. of India* (formerly *Records of the Malaria Survey of India*) 1938. Mar. Vol. 1 No. 1 pp. 57-81. With 3 maps, 1 fig., 3 plates & 2 graphs.

This is a very detailed description of the topography of Bannu and its surroundings with special reference to conditions responsible for the relatively high prevalence of malaria in that cantonment. Numerous irrigation channels are responsible for the prevalence of *A. stephensi*, *A. culicifacies* and *A. subpictus*, the two former of which are the chief vectors. Even if mosquito breeding within cantonment limits could be abolished the extensive breeding that takes place immediately outside its boundary would constitute a danger that is difficult to deal with. The malaria season is well marked; it begins toward the end of August. Cases are most numerous in October and November after which there is a rapid decline in prevalence. Norman White

SCHWETZ (J.) & GERONVEX (E.) Sur le paludisme endémique du Bas-Congo. I. Le paludisme chez les noirs du Mayumbe. II. Le paludisme chez les noirs de la région côtière et des crues. III. Le paludisme chez les noirs de l'agglomération de Boma (Bas-Fleuve). [Malaria among the Natives of (1) Mayumbe, (2) Region of Coast and Crues, and (3) Boma (on the Lower River)]—*Ann. Soc. Belge de Méd. Trop.* 1938. Mar. 31 Vol. 18 No. 1 pp. 115-120, 121-126, 127-132.

These papers summarize the results of the examination of a large number of blood films taken from natives of all ages, but especially children, in several districts of Western Congo. In Mayumbe, which lies to the north of the lower reaches of the Congo, malaria is intensely prevalent. Infections become apparent a few weeks after birth and are almost universal at six months of age. After the fifth year there is a gradual decrease in the parasite index. *Pi. falciparum* is much the

most prevalent *malariæ* coming next and lastly *virax*. *Pl virax* disappears the first then *malariæ*. *Pl falciparum* infections though diminishing in number with advancing age can be found at all ages. Gametocytes are subject to the same progression-regression. Infections in children are very intense. Anophelines are numerous and prominent among them is *A funestus*.

The coastal region bordering the Atlantic to the north of the mouth of the Congo is not far distant from Mayumbe but the conditions are very different. The wooded hills of Mayumbe are replaced by grassy plateaux. In the coastal region anophelines are not numerous and are almost exclusively *costalis*. Malarial incidence is much less severe. Though the appearance of infection its progression and regression are similar parasite indices are lower and gametocyte carriers are fewer in number. The infected harbour far fewer parasites. *Pl malariæ* is much less in evidence and *Pl virax* is either rare or absent.

In Boma which is on the Lower Congo malarial conditions resemble those of Mayumbe rather than those of the coastal plain but the intensity of infections is less. In Boma the most prevalent anopheline is *gambiae*. *funestus* *nils* and occasionally *pharoensis* are also found.

N II

ROOT (Francis M) & ANDREWS (Justin). *Malaria and Anopheline Survey of Grenada, B.W.I.—Amer J Hyg* 1933. May Vol. 27 No 3 pp 549-579. With 1 fig & 5 maps. [15 refs]

The survey the results of which are recorded in this paper was carried out as long ago as July and August 1929. Dr Root died in 1934. More recent surveys of malaria in Grenada have been made the results of which have been published (see EARLE W C this *Bulletin* 1937 Vol. 34 p 140).

In 1929 the incidence of malaria in Grenada was not high the parasite and spleen indices for the 6 000 persons examined (total population of the Island 75 000) were 5.1 per cent and 12.3 per cent. respectively. Malaria was more or less confined to the coastal belt and to altitudes below 500 feet. The spleen index alone was not a reliable index of malaria prevalence. In certain parts of the Island, notably at Victoria on the north west coast there appeared to be other causes than malaria of splenomegaly. The three most prevalent species of anophelines were *pseudopunctipennis* *argyritarsis* and *tarsimaculatus*. The distribution of the breeding places of the last named species corresponded closely with the distribution of malaria the other two species were found in abundance where malaria was rare. The conclusion was reached that *A tarsimaculatus* was probably the most important vector of malaria. (EARLE subsequently arrived at a similar conclusion.)

A II

KIKER (Calvin C) FAIRER (Charles D) & FLANARY (Paul N). *Further Observations on Airplane Dusting for Anopheles Larvae Control.—Southern Med J* 1938 July Vol. 31 No 7 pp 808-813. With 4 figs. (1 map)

This is a description of the experience of the Tennessee Valley Authority with airplane dusting for *Anopheles* control during 1937.

on Lake Wheeler. The two airplanes used are described. A distribution of one pound of Paris green per acre in a 20 per cent. by volume mixture gave satisfactory results, except in areas of dense vegetation. The total cost per treated acre was 37 cents as compared with 90 cents the estimated cost of boat and hand-dusting. \ W

CLARK (H. C.) & KOMP (W. H. W.) A Seventh Year's Observations on Malaria in Panama.—*Amer J Trop Med* 1938. May Vol. 18 No. 3 pp 271-286 With 3 figs. on 2 plates.

These continued observations in an unsanitated area in the Panama Republic have as their object the determination of a method of malaria control suitable for commercial organizations in tropical lowlands where cost excludes anti-mosquito methods. The original plan was to direct special attention to young children and adolescents, the "seed-bed" of malaria infection. Quinine atebirin and plasmoquine were used; the results were not promising. A certain number of carriers are missed at each survey and these are enough to keep up transmission and none of the drugs is sufficient to eradicate infection in large numbers of cases. Malaria exhibits cyclical variations in intensity in Panama and drugs cannot control such variations. A certain amount of natural immunity may be destroyed by treating all sub-clinical cases.

No new conclusions are drawn from the observations made in 1938-37 which are here reported. Three groups were under observation. Some 400 persons in villages on or near the Chagres River were surveyed every month. Those harbouring parasites were treated with atebirin 0.1 gm. three times a day for five days followed by plasmoquine 0.01 gm. twice a day for five days. A similar number of people living in a village on the Gatuncillo, a tributary of the Chagres, were similarly examined once a month. Parasite carriers were treated with quinine sulphate 15 grs. a day for five days, followed by five days treatment with plasmoquine as in the first group. The third group live in villages on the concrete highway between Madden Dam and Panama City. Here treatment was unsupervised: quinine sulphate in capsules, with a list of persons harbouring parasites was left each month with a village officer. Those desiring treatment could get it and take it as they pleased. This was not a very good control group as there were many transients surveyed each month.

Taking all groups together the cumulative results of the year show that 29 per cent. of 841 adults and 41.4 per cent. of 1,057 children harboured parasites. It was a year of low malaria incidence. The parasite index of children from 0 to 5 years was 30.7, from 5 to 10 years 45.5 and from 10 to 20 45.7. The parasite index of persons over 40 was high 28.8. Considering only those persons, 83 in number who were examined in all of the twelve monthly surveys, those found harbouring parasites more than once were 35.7 per cent. of the positive findings in the atebirin plasmoquine group and 61.5 per cent. in the quinine-plasmoquine group. Treatment of the former was better supervised.

In 682 positive examinations, *falciparum* was present in 73.2 per cent. *mix* 13.9 per cent. *malariae* 1.5 per cent., *falciparum* and *mix* 9.5 per cent. *falciparum* and *malariae* 0.8 per cent. *mix* and *malariae* 0.8 per cent. *falciparum* *mix* and *malariae* 0.7 per cent. Crescent carriers were more numerous in the atebirin-plasmoquine treated group than in the unsupervised control group that received

only quinine. This may have been due to the greater frequency of heavy infections in the former. A heavy infection is one in which one or more parasites are found in each microscopic field of a thick film. Only eight of 59 infants below one year of age were found infected. Seven of these were in the quinine plasmoquine group.

The mosquito infection rate of 355 *A. albimanus* dissected in a village of the atabrin plasmoquine group was 1.1 per cent.

The conclusion is reached that where the elimination of *Anopheles* is impossible the immediate treatment of clinical cases is a most useful measure. Such treatment can be given most economically by non medical personnel in the field. Such personnel should be supervised by a medical officer who should make weekly inspection visits. By this method low-grade infections will not be treated and there will be little interference with the acquirement of natural immunity.

A II

ROZEBOOM (Lloyd E.) The Role of Some Common Anopheline Mosquitoes of Panama in the Transmission of Malaria.—*Amer J Trop Med* 1938 May Vol 18 No 3 pp 289-302. With 1 fig. [21 refs.]

When Darling showed from infection experiments that *A. albimanus* was the dangerous malaria vector in Panama eight species of *Anopheles* were known in Panama. Eleven species were listed, but *gorgasi*, *malefactor* and *franciscanus* have since then been shown to be synonymous with *tarsimaculatus*, *punctimacula* and *pseudopunctipennis*. Conditions in Panama have changed. The formation of Gatun Lake created new problems. Now 17 species of *Anopheles* are known to occur—most are rare and of no importance in malaria transmission. Recently discovered species that might be dangerous are *albipennis*, *bachmanni*, *strodesi* and *oswaldoi*. *A. oswaldi* is abundant only in unpopulated districts and so is of no importance as a vector. *A. strodesi* does not feed readily on man. This paper examines the possible rôle of *bachmanni* and *albipennis* as vectors. *A. punctimacula* is also considered in view of Simmons's conclusion that this species is an important vector among military forces on the Atlantic side of the Canal Zone.

The author has previously shown that *A. bachmanni* can be infected with human malaria. *Pl. vivax* can develop in it to the sporozoite stage. It has however a marked preference for animal blood and is therefore relatively harmless.

An account is given of attempts to infect *A. albipennis* with *Pl. falciparum*. One hundred were fed on seven gametocyte carriers. At the same time 113 *A. albimanus* were fed on the same carriers. Only four *albipennis* became infected as compared with 37 *albimanus*.

The refractoriness of the Panama *albipennis* to local *Pl. falciparum* strains is in marked contrast to the susceptibility of the Brazilian *albipennis* to Brazilian strains of *falciparum*.

Observations on the habits of adult *A. albimanus*, *A. bachmanni* and *A. punctimacula* were made in the neighbourhood of two villages on the Chagres River. The identification of the two former species based on adult characteristics, is uncertain. They can be distinguished, however by examining the frill of the mature eggs in the ovaries. In *bachmanni* eggs the entire length of the frill lies on the dorsal surface of the egg. In *albimanus* eggs part of the frill dips down below the tips of the egg. Of 578 *Anopheles* captured in houses 81.7 per cent

were *albimanus* 17.8 per cent. *punctimacula* and 0.5 per cent. *backmanni*. Of 349 *Anopheles* caught in small pig pens near one of the villages 91.7 per cent. were *backmanni*; 7.2 per cent. *punctimacula* and only 1.1 per cent. *albimanus*. The village with the higher *backmanni* density and lower *albimanus* density has persistently lower malaria infection rates than the other. *A. punctimacula* was too scarce to be of importance in malaria transmission in the Chagres River villages.

The author concludes that malaria control in Panama is still dependent upon the control of the only really dangerous anopheline present, *A. albimanus*.  
N W

FARNAUD (E.) Données récentes sur la transmission du paludisme dans les régions maritimes d'Indochine méridionale. [Recent Data on the Transmission of Malaria in Maritime Districts of Southern Indo-China.]—*Bull. Soc. Path. Exot.* 1938. May 11. Vol. 31. No. 5. pp. 397-401.

Malaria in the deltas and on the southern coast of Indo-China is incomparably less severe than in the hyperendemic hilly interior but severe outbreaks may occur. Severe forms of the disease are, however rare and the mortality is low. Malaria on the coast is not endemic. Recent observations in three coastal places Poulou-Condore, Gocong and Cap Saint Jacques, have shown that a sudden increase in malaria mortality has been accompanied by an equally sudden increased prevalence of salt water breeding anophelines of which the most important is *A. sinensis*. *A. subpictus* and *A. sinensis* may play rôles of secondary importance. This increased prevalence of salt water breeding anophelines is transient. In Gocong 125 *ludlowi* were caught in November 10 in December and only 2 were found in February. Similar observations were made in Cap Saint Jacques. In natural conditions *ludlowi* appears to be short-lived. A W

GENEVAY (J.) TOUMANOFF (C.) & HOANG-TICH TRY. Etude préliminaire d'un foyer de paludisme épidémique dans une localité du delta tonkinois. [Preliminary Study of a Centre of Epidemic Malaria in the Tonking Delta.]—*Bull. Soc. Méd.-Chirurg. Indochine* 1937. Dec. Vol. 15. No. 10. pp. 1138-1157. With 4 figs & 1 folding map. [10 refs.]

This is an interesting account of a severe epidemic of malaria in the village of Ha-tri in the autumn of 1937. Ha-tri is in the Tonking Delta, on the bank of the Red River far from the sea and only nine miles from Hanoi. The village has a population of 5,900 and consists of four adjacent hamlets. In the worst affected of the four the highest spleen index observed was only 24 per cent. whereas the parasite index was 90 per cent. and the gamete index exceeded 80 per cent. *Pl. falciparum* was most in evidence. Of 320 larvae examined in October and November 73 per cent. were *hyrcanus* var. *sinensis* and 16 per cent. *acutus*, the remainder being *vagus*. Of the 821 adults caught 217 were *acutus* 448 *hyrcanus* var. *sinensis* 247 *vagus* 8 *ludlowi* and a solitary *jeyporiensis*. This is the first occasion on which *jeyporiensis* has been found at sea-level in Indo-China where the species was considered to be confined to high altitudes. The relatively high frequency of *acutus* is exceptional in the Tonking Delta.

Old borrow pits made during the construction of a bund were the most important breeding places of anophelines. These were most numerous near the worst infected hamlet. Some fifty precipitin reactions were carried out on engorged mosquitoes 41 per cent of *aconitus* and 33 per cent of *hyrcanus* captured in human habitations were gorged with human blood. The small number of cattle in the village and intense anopheline breeding contributed to the high degree of anthropophilism of the mosquitoes caught in the worst infected hamlet. Two of 67 *A. aconitus* dissected harboured sporozoites none of 189 *hyrcanus* dissected was found infected. N W

LEFEBVRE (M) Notes sur l'épidémiologie du paludisme au Laos. [The Epidemiology of Malaria in Laos.]—*Bull Soc Path Exot* 1938 Apr 6 Vol. 31 No 4 pp 281-285

These notes from the laboratory at Vientiane are in two parts the first recounts the results of blood examinations the second spleen examinations. With the exception of a few towns on the banks of the Mekong malaria exists throughout Laos in a hyperendemic form with somewhat less intensity however in the plains which border the river. It is by far the most important cause of morbidity and mortality and is a serious obstacle to the development of the country. The mean parasite index of the country is about 43 per cent. *Pl. falciparum* infections are most frequent 72.4 per cent. of clinical cases and 63.9 per cent of chronic cases. *Pl. vivax* comes next 18.6 per cent of clinical cases and 20.4 per cent of chronic cases. The remainder are quartan infections. Quartan malaria is most prevalent in the two northern provinces which border Burma, 24 to 26 per cent. There are two annual exacerbations of the disease the first in May and June at the beginning of the rains the second in October at the beginning of the cold season. The mean splenic index of the country is 59 per cent. The vast majority of the population is infected early in life. Repeated infection occasioned by an abundance of anopheline vectors determines a state of premunition. Clinical manifestations of the disease are therefore relatively uncommon and not severe. The abundance everywhere of apparently healthy looking parasite carriers implies great dangers for all non immune immigrants. N B

CORRADETTI (Augusto) Ricerche epidemiologiche sulla malaria nella regione Uollo-Jeggu durante la stagione delle piogge. [Epidemiological Observations on Malaria in the Uollo-Jeggu District during the Rainy Season.]—*Riv di Malarologia* Sez. I 1938 Vol. 17 No 2. pp 101-110 With 1 fig. English summary

The observations recorded relate to a labour force engaged on road construction work on the Asmara Addis Ababa road as it traverses the Uollo Jeggu region. From July to October every ten to fifteen days the blood was examined of every worker who had suffered from any febrile disorder since the previous examination. The majority of the men employed had never previously suffered from malaria. Malaria is widespread at altitudes below 5 400 feet. No mention is made of the number of men employed. In all 1 431 blood examinations thick drop were made. Parasites were found in 448 *falciparum* in 284 *vivax* in 151 both in 13. *Pl. malariae* was not seen. The anophelines identified were *gambiae mauritanicus christyi pretoriensis* and *garnhami*. *A. gambiae* is the chief vector. The precipitin test on 214



*gambias* captured in barracks showed 57.4 per cent. positive for human blood. Eight specimens of *A. mauritanicus* var. *paludis* were also examined—they all contained human blood. This species may be of importance in malaria transmission. The other species found do not appear to be of malarial importance. V II

MIRA (Miano Graquinto). Accertamenti sullo stato endemico della malaria nelle zone di Moggio—regione del Lago Zual—Dessie—regione del Lago Haik—Ambò. [Endemicity of Malaria in the Moggio Area, the Region of Lake Zual, Dessie, the Lake Haik Region, and Ambò.—*Rass Sanitaria d'Impero* Addis Ababa, 1938. Jan-Feb. Vol 1. No 4-5. pp 9-30. With 11 figs on 4 plates. [25 refs.]

This is an account of an inspection made of parts of Abyssinia to determine the malaria conditions prevailing therein. It is illustrated by photographs depicting the nature of the country and the types of some of the inhabitants. In Moggio and Lake Zual districts the spleen index varied from 4 in Adami Tullo to 33.3 in Moggio. In most parts the parasite index was between 10 and 12. *Pl. vivax* was more in evidence than *Pl. falciparum*. The species of anophelines identified were *coastalis*, *pharoensis*, *cinerus* and *de meillon*.

In Dessie the spleen index was 10.3, parasite index 2.5, all *vivax* infections. *A. cinereus* and *A. de meillon* were found. No anophelines were found along the shore of Lake Haik and no parasite carrier. In Borchemma at 1,600 metres there was a spleen index of 24 and a parasite index of 8. *vivax* and *falciparum* were equally prevalent. The anophelines found were *de meillon*, *cinerus*, *pretoriensis* and *gambias*. In Ambò the spleen and parasite indices were both zero. *A. de meillon* was present. A II

PARROT (L.) & CATANEI (A.). Sur la fréquence et les modalités des infections paludéennes mixtes en Algérie. [Frequency of Mixed Malarial Infections in Algeria.]—*Arch. Inst. Pasteur d'Algérie* 1939. Mar. Vol 16. No 1. pp 10-13.

A population of a highly malarious part of Algeria was recently kept under observation for 17 months during which time very abnormal meteorological conditions caused a cessation of anopheline breeding so that fresh infections ceased altogether. The blood of 1,878 persons was examined on 23 occasions. Of these persons, 311 harboured parasites at one time or another. Two hundred and seventy-four (88.1 per cent.) of these were single infections, *falciparum* 185, *vivax* 68 and *malariae* 41. Thirty-seven, 11.8 per cent. had mixed infections. The association of parasites in these mixed infections was *falciparum* and *vivax* 25, *falciparum* and *malariae* 6 and *vivax* and *malariae* 5. All three species were associated in one case. V II

BOCCONNI (Giulio). Malaria e lotta antimalarica a Castelvolturno (Napoli) nel 1937. Nota. Anti-Malaria Measures at Castelvolturno (Naples).—Reprinted from *Rendiconti d. R. Accad. Sci. Med. e Chirurg. d. Soc. Reale di Napoli* 1938. Vol 92. 15 pp.

Castelvolturno is a little township of 1,309 inhabitants on the left bank of the Volturno and lies to the north-west of Naples. The standard of living is low, sanitation is non-existent. The houses are

of the poorest. The population are for the most part agricultural labourers and buffalo-herds. Malaria is very prevalent as is helminthiasis (*ascaris* and *trichuris*)

During 1936 and the first five months of 1937 the number of primary cases of malaria recorded was 36 and of relapses 735. A house-to-house census was made. In all 366 persons who had recently suffered from malaria, underwent curative treatment consisting of atebirin (0.3 gm. a day) for five days and after 5 days interval a three-days course of plasmoquine 0.03 gm. a day. Proportionally smaller doses were given to children below the age of 15. The drugs were given in the patients' homes after the evening meal. In two cases of the 366 the administration of plasmoquine was followed by severe symptoms intense vomiting and methaemoglobinuria.

Of the 366 persons who had undergone this treatment at the beginning of June 291 received the drugs prophylactically each week till the 30th October. Adults received 0.2 gm. atebirin and 0.01 gm. plasmoquine each Saturday and Sunday. A further 23 persons who had not undergone curative treatment received this prophylactic treatment.

The results were encouraging. The persons who underwent treatment were among the poorest and more exposed to infection than the remainder of the population; there were many cases of chronic malaria among them. In spite of this and a high prevalence of anophelines clinical attacks of malaria were less frequent among them than among the rest of the population. N II

FAUST (Ernest Carroll) *Malaria Mortality in the Southern United States for the Year 1936.*—*Southern Med J* 1938 July Vol. 31 No 7 pp 816-818 With 1 fig (map)

Mortality data are the only reliable malaria records in the fourteen States here considered. The malaria death rate for these States combined was 10.2 per 100,000 in 1936 as compared with 11.0 in 1935. The population of these States approximates 35 million. In three States Georgia, North Carolina and Oklahoma there was an increased prevalence in 1936. The disease appears to be more prevalent in the coastal portions of Georgia, South Carolina, North Carolina and Virginia, in the southern half of Alabama and the north-central part of Florida and is extending into the highlands of the Carolinas and into the northern part of Alabama. On the other hand the Mississippi delta reported considerably fewer malaria deaths.

There is a higher average malaria mortality in the southern United States than there was ten years ago. Malaria is extending into areas in which malaria was then of little importance. The factors influencing the spread of the disease and the cyclic fluctuations of malaria mortality are unknown. Malaria is becoming an increasing menace to life and to economic development in the Southern States in spite of increased efforts to control the disease. A III

MANSON (D) *A Method of Anti-Larval Oiling for Rivers.*—*Indian Med Gaz* 1938 May Vol. 73 No 5 pp 284-285 With 2 figs.

In the rivers and streams of Assam in the intervals between heavy rainfalls when the velocity of flow falls below two miles an hour larvae of *A. minimus* the most important local vector are found in

abundance along the banks. This necessitates the use of a larvicide during the monsoon months, in conditions which render the application of oil by usual methods difficult and costly. A method which has given good results is described. A strip of coarse gunny about 15 feet long and 3 feet wide is selected. The mesh should be as wide as possible. To one side of this strip transverse strips of wood or bamboo are tied at intervals of 2 to 3 inches. The object of these strips of wood is to support the gunny on the water. The lighter they are the better. They are on the upper side of the gunny when in use. The gunny mat is well oiled with Malarol, rolled up and carried to the river bank. It is unrolled quickly over the area to be treated, one edge resting on the bank. After 15 to 20 minutes the mat is rolled up and used again. One oiling is sufficient for three or four areas, the oil being conserved in the meshes of the gunny. This method of oiling is very cheap and has been successful where other methods have proved wasteful and only partially effective. N IV

RECTOR (Nelson H.) Different Phases of Permanent Drainage for Malaria Control in Mississippi.—*Southern Med J* 1938. July Vol. 31 No. 7 pp. 813-815. With 3 figs.

Malaria is an important cause of sickness in Mississippi but it is only very recently that any attempts have been made to control mosquito breeding by permanent measures. This paper describes the progress that has been made. Filling of ponds, concrete lining of ditches and the drainage of marshy areas by underground tile drains have been used. Ditch lining receives most attention. A round bottom invert with the banks of the ditch covered with Bermuda sod gives the best results in local conditions. Wood ash is a satisfactory fertilizer for the sod and enables it to remain green all the winter. N IV

THOMAS (J W) & SYDENSTRICKER (V P) Further Notes on Pernicious Malaria.—*Southern Med J* 1938. Mar Vol. 31 No. 3 pp. 300-302. With 1 fig.

Two hundred and forty four cases of malaria were hospitalised on account of the severity of symptoms during a three-year period. The mortality rate was 4.09 per cent. All deaths were cases of *falciparum* infection with pernicious symptoms. There were 78 cases of pernicious cerebral malaria, of which the mortality rate was 11.86 per cent. In the treatment of these cases Ringer's solution is given subcutaneously 2 to 4 litres during the first 24 hours to combat dehydration. Dextrose solution, 10 per cent is given intravenously 500 cc every 4 to 6 hours. Quinine dihydrochloride 0.5 gm is added to the first dextrose injection. This dose is repeated every six hours until the acute cerebral symptoms have disappeared, or until the patient is able to take drugs by mouth. When vomiting stops the drug is given by a duodenal tube in preference to continued intravenous medication. In most cases only one intravenous injection of quinine was required. N IV

CANOVA (F) Sindromu appendicolari malariche. [Malaria simulating Appendicitis].—*Riv di Malarologia* Sez. I 1938. Vol. 17 No. 2 pp. 137-142 [13 refs.] English summary (10 lines)

The author describes three cases which were admitted to hospital with symptoms characteristic of appendicitis. In all three infection

with *Pl. falciparum* was responsible for the condition which cleared up rapidly with appropriate malaria therapy. The symptoms appear to be due to abnormal stimulation of the sympathetic nervous system. The condition is rare—these cases were the only three observed among some 8 000 cases of malaria treated. N IV

VAUTHEY (Paul) & VAUTHEY (Max) Paludisme et lithiase biliaire. (Etude clinique et statistique sur 100 cas observés à Vichy) [*Malaria and Biliary Calculi. Clinical and Statistical Study of 100 Cases observed at Vichy*].—*Arch Mtd Gén et Colqn* 1938. Vol. 7 No 2 pp 50-61

Vichy is a spa that has special attractions for those who have suffered from malaria as well as those suffering from cholelithiasis. It is not surprising therefore to find that a considerable number of persons suffering from the latter complaint give a history of antecedent malaria. With the object of trying to determine what part if any malaria plays in the causation of cholelithiasis the authors have brought together notes of the last hundred cases of this kind that have come under their observation. In 23 of these cases biliary colic first made its appearance during an attack of malaria—in 71 cases biliary colic appeared after the extinction of all clinical signs of malaria—in the remaining six cases information was incomplete. In 15 cases there appeared to be no doubt that malaria was the cause of the lithiasis—in 16 other cases in which lithiasis appeared after cessation of clinical signs of malaria malaria may have been an aetiological factor. In some of these there was no other ascertainable cause of the lithiasis—in others malaria may have contributed by damage done to the liver tissue. N IV

FISCHER (O) Ueber einen Fall von Malariaexanthem. [Case of Malarial Skin Lesion].—*Arch f Schiffs u Trop Hyg* 1938 Aug Vol. 42. No 8. pp 372-375 With 1 fig

The author describes a case of benign tertian malaria during the course of which a crop of petechiae each about the size of a pinhead, appeared in the skin of both legs also a larger extravasation occurred on the left hand after accidentally striking it against the side of the bed. A biopsy of one of the petechiae was made and showed that there was a collection of cells round the vessels near the extravasation in the skin—malaria parasites could not be determined with certainty—pigment not malarial pigment was present in the collection of cells probably it was natural skin pigment. He discusses the question of the subcutaneous haemorrhages being due to quinine and refers to the paper of MÜHLENS (see this *Bulletin* 1938 Vol. 35 p 103) on this subject but rules out quinine as a cause in his case. The lesions disappeared along with the fever after quinine treatment. [The reviewer saw recently in a case of malaria therapy for G.P.I. a similar lesion. Crops of petechiae appeared in the skin on various parts of the body and one large extravasation occurred over the buttocks. Quinine had not been given before the cutaneous haemorrhages appeared. *Plasmodium vivax* was used in the case.] E D W Gregg

ESKIN (A. A.) [A Case of Natural Infection with *Plasmodium ovale* in Man from U.S.S.R.]—*Med. Parasit. & Parasitic Dis.* Moscow 1933. Vol. 7. No. 1. [In Russian. pp. 40-43. With 9 figs. on 2 plates.]

The author describes a case of infection with *Plasmodium ovale* contracted by a patient near Ufa (eastern Russia) which is the first record of this species from Europe. Though *P. ovale* was present in the blood together with *P. ferox* the two parasites could easily be distinguished morphologically in those stages which differentiate them, while the changes in the erythrocytes were also typical. In anophelines infected from this case oocysts and sporozoites were found to develop at a different rate. Blood from this case was used in five successive passages through G.P.I. patients, in the blood of which *P. ovale* likewise made its appearance. The attacks of fever were easily controlled by a single course of atabrin treatment. *P. ovale* as observed in this case, is described in detail with good figures illustrating all stages of development of this parasite. The author points out that he submitted blood films from this case to Dr. WENYON and the reviewer who were able to confirm his diagnosis.

C. A. Hoare

SIREUX (H.) Nouvelle méthode de coloration et de diagnostic des protozoaires sanguicoles dans les gouttes épaissies (saponine-bleu de méthylène) [New Method of staining Thick Films.]—*Bull. Soc. Path. Exot.* 1933. Feb. 9. Vol. 31. No. 2. pp. 100-103. (16 refs.)

For the purpose of rapid diagnosis of blood parasites the author advocates the use of the following mixture which dehaemoglobinizes the red cells by virtue of the saponin and stains the parasites and leucocytes by virtue of the methylene blue.

Distilled water	300 cc.
Methylene blue	0.6 gm.
Sodium chloride	1.8 gm.
Sodium citrate	3.0 gm.
Saponin	2.0 gm.
Formol (15 per cent)	12 cc.

The mixture is poured over a thin or thick film and allowed to act for one or two minutes. In the case of thick films the stain is poured off and fresh stain applied. According to the thickness of the film this is repeated three to five times. When staining is complete the stain is poured off and a cover glass applied. Examination of the film being made in the small quantity of stain remaining under the cover glass. There being little danger of the thick film floating off the slide drying in the first place may be conducted rapidly by repeated gentle warming in a flame and blowing. The whole process of preparation and staining of a thick film does not occupy more than three or four minutes—a considerable saving of time when rapid diagnosis is necessary.

C. M. Wenyon

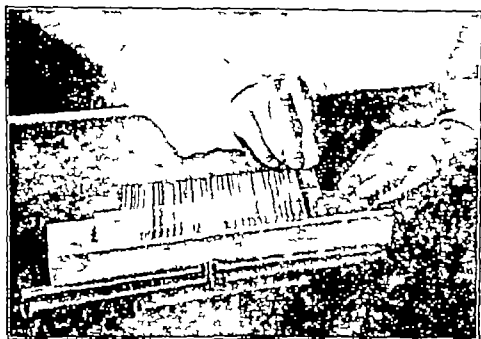


Fig 1 Slides fastened between the spirals of springs.



Fig 2. Blocks of slides in staining dish.

[Reproduced from the *Taiwan Igakkaï Zasshi*]

MATUMOTO (Tomokiti) & HIRASIKI (Yasuo) A New Simple Method of staining the Films for the Mass Diagnosis of Malaria.—*Taiwan Igakkaï Zasshi* (*Jl Med Assoc Formosa*) 1938 Apr Vol. 37 No 4 (397) [In Japanese pp 772-774 With 4 figs on 1 plate. English summary p 774]

For the rapid staining of large numbers of blood films the authors devised a method for which the apparatus is —

1 A spiral steel spring 16.5 cm. long 0.15 cm diameter, the distance between spirals being about 0.075 cm.

2. A wooden plank in which two nails are driven to fix the spring while the slides are being inserted, at a distance of about 24.5 cm.

3. A staining dish.

**Method.** Fix the spring between the nails, insert the slides between the spirals, remove the spring from the nails, immerse the films in Giemsa's stain for the usual length of time, wash and dry. After drying, extend the spring, thus releasing the slides. In the illustration only the ends of the slides are immersed, presumably the blood is placed there to save stain.

C W

GARCIA (Eusebio Y.) To demonstrate Free Malarial Parasites in Vitro.—*Jl Philippine Islands Med Assoc* 1937 June Vol. 17 No 6. pp 347-348. With 2 figs. on 1 plate.

For the study of malarial parasites the author has obtained good results by putting up malaria infected blood as for culture of the parasites and keeping the culture tubes at 10°C. instead of at 37°C. Control tubes can be kept at the higher temperature. Samples can be withdrawn and studied by the usual methods.

C M W

RODHAIN (J) & MUYLLE (G.) Sur la spécificité des plasmodium des anthropoïdes de l'Afrique Centrale [Specificity of Plasmodia of Central African Apes.]—*C. R. Soc Biol* 1938. Vol. 127 No 14 pp 1467-1468.

REICHENOW the discoverer of the three species of *Plasmodium* of chimpanzees in the Cameroons, considered them to be identical with *vivax falciparum* and *malariae* a view which has not been generally adopted by later observers. The authors of this paper have had no difficulty in transmitting these parasites from chimpanzee to chimpanzee. They have had an opportunity of trying to infect three patients requiring malaria therapy with the *vivax* and *falciparum* types of these parasites, but without success. The first had an intra muscular injection of 5 cc. of chimpanzee blood containing numerous schizonts and gametes of the *vivax* type the second had an intra venous injection of 2.5 cc. of chimpanzee blood containing scanty small rings of the *falciparum* type as well as a few schizonts of the *vivax* type the third had an intravenous injection of 5 cc. of chimpanzee blood containing fairly numerous small rings of the *falciparum* type. None of the three patients contracted infection.

N IV

SANDROCCI (Giovanni) Sul potere infettante degli sporozoit immaturi. [Infectivity of Immature Sporozoites.]—*Riv di Malariologia*. Sez I 1938. Vol 17 No 1 pp 78-82. English summary

The author of the present note and JERACK have previously described experiments which in their opinion proved that malarial sporozoites (*P. praecox*) before they reach the salivary glands or even shortly after they have entered them, are immature and incapable of producing infection when injected into the vertebrate. MISSEKOLI and NERI subsequently contested this conclusion and maintained that sporozoites from the body cavity of mosquitoes were infective. The author now argues that there is a possibility that in dissection of mosquitoes heavily infected salivary glands may rupture and liberate mature sporozoites into the body cavity.

C M W

CORRADETTI (Augusto) Osservazioni sul ciclo schizogonico dei plasmodi nelle cellule dei tessuti e proposta di una nuova classificazione degli *Haemosporididae* [Schizogony Cycle of Plasmodia in Tissue Cells. Proposed New Classification of the Haemosporididae.] —*Riv di Parassit.* Rome 1938 Jan. Vol. 2. No 1 pp 23-37 [16 refs.] English summary

The author points out that the view that there must exist stages of development of malarial parasites other than those which occur in the red blood corpuscles in order to account for the behaviour of parasites directly after the injection of sporozoites and the resistance of certain infections to treatment ought to be attributed to GRASSI and GOLGI who were the first to suggest that such undiscovered stages exist. The recently discovered stages of development in endothelial and other cells in various bird malarial infections are not the forms into which sporozoites directly develop before invasion of the red cells occurs for they are found after injection of sporozoites as well as after injection of the red blood cell forms. This discovery suggests that the plasmodia and halteridia are not sharply separated from one another and that it would be more rational to group the two types of parasite in one family the Plasmodiidae

C. V. W.

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## MISCELLANEOUS

- CHOPRA (R. N.) *The Physiology of the Individual in the Tropics.* Paris I & II.—*Indian Med Gaz.* 1938 Jan & Feb. Vol. 73. Nos. 1 & 2 pp. 40-45 102-109
- *The Physiology of the Individual in the Tropics.*—*Jl Trop Med & Hyg* 1938. Mar 15 Vol. 41 No. 8 pp. 89-97 13 refs. [Summary appears also in *Bulletin of Hygiene*]

This abridged account of the Presidential Address given to the Section of Physiology at the last Indian Scientific Congress (1938) is a considered review of the state of knowledge in an important but rather neglected subject. The address is worthy of close attention not only for the array of facts and theories condensed from a wide reading of the literature and illuminated by a thorough understanding of the complexities but also for the formulation of a number of principles which help to co-ordinate and explain many of the phenomena so far reported.

In the more detailed discussion of changes and responses on the part of the body to habitation of the tropics Professor Chopra maintains a justifiably critical viewpoint in evaluating findings and ideas advanced in the literature. At the same time he puts forward a number of stimulating suggestions for enquires into various questions. His concluding remarks embody a plea for more and more careful research in this complex field in which the material is so abundant and so promising of valuable discoveries.

J. S. HENNER

- PRIDIE (E. D.) *The Hospital Administration of the Sudan Medical Service.*—*Nosokomion* 1938 Apr Vol. 9 No. 2 pp. 97-103. With 1 map

The staff at headquarter consists of a Director and three Assistant Directors (of public health, hospitals, and laboratories and research) and there are four specialists (in medicine, surgery, obstetrics and ophthalmology). The teaching of subordinate Sudanese staff is under the control of the Assistant Director (hospitals) but the Kitchener School of Medicine is a non-Government organization controlled, as regards its academic work, by a school council of which the Director of the Medical Service is *ex officio* chairman.

Each province has a parent hospital, a number of smaller hospitals and a number of dispensaries. Thus there are 38 hospitals and 337 dispensaries administered by the Service. In addition a hospital ship with accommodation for about 40 in-patients and a motor launch are used on the Nile.

Distances are so great and transport so difficult in some places that the cost of drugs is enormously increased. For the same reason small Native villages called rustic hospitals are built near hospitals or dispensaries to accommodate patients who require constant but not in-patient treatment for example cases of syphilis and chronic ulcer.

In Khartoum a central block of administrative hospital and laboratory buildings will be completed in a few years.

Of the 43 British doctors in the Service 32 are available for routine duties and are termed Medical Inspectors. They are not as a rule attached to any hospital (except to a few of the larger ones) but exercise a general supervision over the hospitals and dispensaries of a

province or large district acting as consultants. The senior medical officers of provinces are responsible for both hospital and public health work.

Curative medicine must be the first approach to the medical administration of a primitive country in order to create confidence in the medical service and sweeten the pill of preventive medicine which should follow it. Preventive medicine should then become the principal aim of a service so that at a later stage of development crowded hospitals and dispensaries become a cause for misgiving instead of satisfaction.

The medical officers who are in charge of hospitals are Sudanese doctors who have qualified at the Hutchener School of Medicine.

In the Sudan Medical Service where the proportion of local staff has been steadily increasing for many years about 90 per cent of the officials are Sudanese.

Nursing is carried out by locally trained male and female nurses and midwives. British Sisters travel by air in emergencies. Sudanese trained by the British X-ray technician are in charge of X-ray sets in various places. Sudanese laboratory assistants are trained in Khartoum and distributed to the provinces.

In an area of 969 600 square miles 5,542 beds and 107 qualified doctors are available for the 5,944 477 inhabitants and in 1936 96 081 in patients were admitted and 11,229 operations performed.

[It would be interesting in view of the importance of the subject of the training of African Natives in modern medicine if the author who is Director of the Sudan Medical Service could follow this up with an account illustrating the efficiency of the Sudanese members of the medical staff. Such a report might stimulate the increase of similar training in other parts of Africa.]

C II

CASTELLANI (Aldo) *Hygienic Measures and Hospital Organisation of the Italian Expeditionary Forces during the Ethiopian War, 1935-36.*—*Jl Roy Soc of Arts* 1938 May 27 Vol. 86 No 4462. pp 675-689 [Summary appears also in *Bulletin of Hygiene*]

The war officially extended from 3rd October 1935 to 9th May 1936 a period of seven months (219 days) covering the healthy period of the years and avoiding the dysentery malarial and sandfly seasons. The total European forces including police naval ratings and irregulars numbered 500 000 men [but the average daily strengths are not stated]

Prophecies of heavy disease incidence are mentioned. A series of well-known stock examples of previous campaigns of 30-40 years ago with very high morbidity are quoted for comparison but no comparisons with modern campaigns of similar type are mentioned.

It was fortunate that the head of the Italian Government realized the enormous importance of medical arrangements and demands in a tropical country. These were all placed under one control were complied with in full and were at times even given priority over munitions.

The medical organization given in detail included 135 base and field hospitals 139 water sterilizers Potabilizzatori and 18 cleansing sections and stations. The total of medical officers is given as 2 484 [approximately 5 per 1 000 of strength] and subsidiary services such

as chemists, pharmacists and army chaplains 456. Red Cross nurses numbered 384 and nuns and missionaries 200. Of rank and file there were in all 15,500 on land and 639 on ships. The former appear to have been used extensively for roadmaking.

A series of slides was shown to demonstrate the results of this health organization.

**Malaria.**—Comparative figures from Macedonia and the Struma Valley are stressed and the statement made that in the tropics the malarial season may be said to extend through the whole year and that this applied to parts of Ethiopia. Malarial admissions were 2,334, 1,241 fresh and 1,083 relapse cases (approximately 8 per 1,000 per annum) and deaths 23. These results are attributed to prophylactic quinine sulphate or bishydrochloride 8 grains daily checked by Tanret examinations of urine.

**Dysentery** was rampant in the Crusades and in the Middle Ages and in such recent campaigns as Madagascar and Gallipoli. The Italian cases in this war are given as 453 with no deaths and the great majority are said to be *amoebic* dysentery. This is attributed to the prophylactic measures taken, viz. —

(a) Water supplies. Imported naturally pure or purified by boiling [no mention is made of the time or fuel required for this herculean task] or by chlorination, a fairly stable chlorine-containing tablet being used.

(b) Washing of hands after visiting the latrine with 4 or 5 drops of 2 per cent. lysol.

(c) The use of a flannel abdominal belt.

**Typhoid and paratyphoid.**—Figures are quoted from French, British and American campaigns of the last century showing the heavy incidence of these diseases. In this campaign there were 458 cases with 161 deaths (35 per cent. of case mortality). Among the precautions taken a Tetra vaccine (Typhoid + para A and B + cholera) was used.

**Relapsing fever** 17 cases. Of other diseases such as typhus, beriberi, pellagra, scurvy, ankylostomiasis, filariasis, leprosy, gas gangrene, cerebrospinal fever, plague and cholera there were no cases. Of the intestinal worm infections it is stated that there were only two cases.

For avitaminosis the principal prophylactic measure consisted of a balanced ration similar to the soldiers' ration in Italy with the addition of a lemon a day.

Minor diseases received much attention and descriptions are given of scorpion bites, prickly heat, jiggers and diabolic itch.

In summing up the author states that morbidity and mortality was less in the war zone than in similar numbers of troops in Italy. [No figures for sick or death rates among the latter are given.] The total number of deaths were 1,099 from battle casualties and 599 from disease. [This gives a death rate from disease of 2.05 per 1,000 per annum, a truly remarkable figure.]

T. O. Thompson.

STEVENS (H. Lockwood). *Tropical Diseases, Their Cost to Plantation Industries.*—Reprinted from *Empire Producer* 1938 Feb. 2 pp.

The author gives a brief account of the inception of the Ross Institute of Tropical Hygiene, now amalgamated with the London School of Hygiene and Tropical Medicine. Emphasis is laid on the economic aspect of malaria, and the author points out that the Ross Institute owes its origin not only to Sir Malcolm Watson and his

co-workers but also to those business men who realized that malaria in plantation labourers costs more than scientifically regulated control and that the improvement in the general health of labourers and their families which follows such control is on both economic and humanitarian grounds strongly to be desired. Healthy plantations attract labour and offer inducements for the permanent settling of families. Unhealthy plantations often experience difficulty in maintaining an adequate labour force.

Figures are given. In large estates in Malaya it was found on careful analysis that the cost of production on estates where malaria was not controlled was 25 per cent higher than on estates where anti-malaria measures were in force. On certain estates in India, sick days in 1927 totalled 249,306. In 1933 by which time anti-malaria measures had been instituted the sick days totalled 141,687 and £6,000 per annum was being saved in the cost of the maintenance of sanitation and general health. On other Indian estates the annual admissions to hospital of cases of malaria fell from 10,378 in 1929 to 848 in 1935 a reduction of 92 per cent. and the admissions from causes other than malaria fell from 28,659 to 16,143 in the same period.

The medical officer of the group (of estates) estimated that the annual saving due to anti-malaria measures taking into account the cost of these measures was £4,500.

Six hundred laymen have now attended the free course on malaria control (lasting one week) which has been organized by the Institute.

C IV

VICKERS (W. J.) & STRAHAN (J. H.) *A Health Survey of the State of Kedah with Special Reference to Rice Field Malaria, Nutrition and Water Supply 1935-1936.*—pp v + 96. With 4 maps 36 figs. on 16 plates & 12 charts. [£1 50]

[The sections of this report dealing with malaria and nutrition are abstracted elsewhere see this *Bulletin* 1938 Vol. 35 p 416 and *Bull. of Hyg.* 1938 Vol. 13 p 559]

In the introduction to this report the special methods of investigation adopted are described particularly the method of approaching the rural population and of securing the voluntary co-operation of the headmen. Headmen were informed by Government that the survey was to be made, and were interviewed by the Health Officer. Lists of inhabitants were obtained examination centres arranged, and leading residents interviewed, by the senior inspector who made notes on health conditions and previous epidemiological findings. After this preparation, the survey staff arrived on a pre-arranged date and combined their epidemiological work with treatment of disease. That the population in most districts readily responded to the advances made must largely have been due to the thoroughness with which the ground was prepared and the tact with which the religious and civil headmen were treated. This account of preliminary education and persuasion may serve as a model for such undertakings.

The widespread and severe anaemia encountered among this rural population is mainly due to the three conditions of malaria, helminthic infestation and bowel disease and dietary defects and the authors believe that malaria may not be so important in this respect as the other conditions though it is undoubtedly a factor. Examination of

faeces was impracticable but helminthic infestation is almost universal and the presence of nutritional anaemia is proved.

The intestinal conditions are bound up with the state of the water supply which in 75 per cent of the population is uncontrolled. Streams are used both as latrines and sources of domestic water supply and the other sources are usually open to contamination. The authors make recommendations on this difficult subject and record their opinion that a wholesome water supply and education in the wearing of shoes might prove the most practicable solutions of the intestinal problem.

With regard to other diseases, the authors think that many mild cases of enteric occur but are not reported that pneumonia is commoner than reports indicate, that there have been mild epidemics of influenza and measles, but that tuberculosis, venereal disease, diphtheria and cancer are relatively unimportant. Yaws and leprosy are constantly present and a quarter of the population suffer from skin disease of which a large proportion may be classed as dirt disease. Minor degrees of avitaminosis were seen in 222 instances in 10 000 people examined, and major forms in a small number and goitre (due to iodine deficiency) and cretinism are relatively common. Deaths from pregnancy and childbirth are high. The authors are uneasy over the finding that 15 per cent of the population are unvaccinated.

The figures and photographs with which the report is illustrated are clear and well chosen and the whole publication is an example of how the difficulties inherent in such a survey have been overcome and of how valuable information as to the state of health of a backward community may be obtained by enthusiasm combined with careful preparation. It would be interesting to read in due course a companion volume of the results obtained by putting into effect the suggestions made by the authors.

C. IV

BLACK (E. Couper) & CLEVELAND (J. Burton) Pathological Lesions in Australian Aborigines, Central Australia (Granites) and Flinders Range.—*Jl Trop Med & Hyg* 1938. Mar 1 Vol. 41 No 5 pp 60-83 With 12 figs. & 1 map [16 refs.]

These notes were made during two anthropological expeditions the first to the Granites in the Northern Territory 380 miles N W of Alice Springs lat 21°S the second to Nepabunna Mission Station in the Flinders Range 375 miles N of Adelaide at 30°S.

At the Granites, where rainfall is about 10 inches, 50 natives were collected nearly all nude and living their natural nomadic life. An account is given of the neoplasms and cysts seen, diseases of the alimentary tract and male generative organs, of muscles, bones and joints, of skin and subcutaneous tissues including scars and keloids, of eye and teeth lesions.

The chief interest for readers of this *Bulletin* lies in the *Treponema* infections special reference is made to HACKETT's account of boomerang leg (see this *Bulletin* 1936 Vol 33 p 962) and HUDSON's work on Bejel on the Euphrates (*loc cit* p 966). Of 17 natives who were closely studied some degree of boomerang leg was noted in seven, four of which occurred among six children. The condition was most marked in children aged 8-12 years and the authors suggest a nutritional defect, possibly a result of drought. Of the three adults two had

gangosa and no other cases were seen. Three of the children whose blood was examined had a positive Wassermann.

A table shows the Wassermann serum reactions grouped by age and sex. In 39 natives of all ages the percentage of positives was 74.4. Five children (aged 8-15) were all positive as were 20 natives out of 24 aged 15-30. At ages above 30 the positives declined. Figures are given of percentage of positives further south and it is concluded that positive Wassermans are more likely to be met with in latitudes near the equator.

Here in Australia, write the authors, we have a non venereal treponematosi widely diffused by the evidence of positive blood Wassermann reactions and the various lesions recounted in this paper together with pathological bones from parts where the natives have died out. The disease does not exactly resemble yaws. It has not the florid early eruptions, neither are its lesions quite the same as syphilis nor the recently described bejel of the Bedouin Arabs. Hudson (1937) who describes bejel, thinks it is a clinical entity.

They suggest that it merits a distinctive name and propose the native word Irkintja already used by HACKETT and predecessors. They point to the confusion, medical as well as lay, between venereal syphilis, granuloma pudendi and the Australian form of yaws and note that syphilis may be ruled out. For the irkintja eruption the paper should be consulted.

The records are fragmentary and the conclusion is reached that the course of the treponema infection in Australian aboriginal children is not known nor the mode of infection from child to child.

The civilized (Nepabunna) natives gave negative blood Wassermans and showed no late treponema lesions. *A. G. Bagshawe*

GORGAS MEMORIAL INSTITUTE. Annual Report of the Gorgas Memorial Laboratory for the Period ended June 30 1937 [CLARK (Herbert C.) Director]—24 pp. 1938. Washington. Govt Printing Office.

Besides the permanent staff a number of visiting scientists have worked at the Central Laboratory at the Miraflores Veterinary Out Station and at the Santa Rosa malaria control station during the year while in addition various expeditions have been undertaken.

The Malaria Control Station has made observation on the control of malaria by means of antimalarial drugs and on the correlation between the human and mosquito-parasite index, while work at the Veterinary Station has been limited to studies of *Strongylus vulgaris*. The department of entomology has made extensive investigations of the potential malaria vectors, the protozoological department has been especially concerned with the study of Chagas disease and a good deal has been done on the snake survey. Much work has been carried out by the department of helminthology on the worm diseases of equines and considerable time has been devoted to the identification and classification of other parasites received from various sources.

In addition to such manifold activities and besides co-operating with the work of other organizations the laboratory has lent valuable aid to a number of investigations of which nutritional studies and surveys of one sort or another are only examples. *F. Murgatroyd*

COCHRANE (E.) Tuberculosis in British Guiana.—*Tubercle* 1933 June & July Vol. 19 Nos. 9 & 10 pp. 403-415 453-466. [With 3 charts. [19 refs.] [Summary appears also in *Bulletin of Hygiene*]

This is an account of the history of tuberculosis in a colony in which thanks to accurate statistics, more reasonable conclusions can be arrived at than is usually the case. The population consists of the Negro descendants of slaves Portuguese, East Indians, Chinese and other smaller groups. The total population (1934) is 323 171 and Georgetown, the capital, has 63 080 inhabitants. The principal industries are the cultivation of sugar cane and rice. The climate is fairly hot very damp and very even.

The British Guiana Society for the Prevention and Treatment of Tuberculosis was founded in 1907 Dispensaries and branches were opened at various times, and Health Visitors, chosen from women of Negro stock for their education and character were appointed and have proved to be most successful. The medical work is conducted either by private practitioners or Government Medical Officers.

Collapse therapy was introduced in 1933 and was accompanied by a careful system of contact examination. 324 contacts were followed up in 1933 as against only 40 in 1932. The effects of these two measures have been shown on the attendance figures 1 640 in 1935 as against a yearly average of about 750 in preceding years from 1920. The methods adopted in the dispensaries are approximately those used in England except that fluoroscopy is perhaps relied upon more, in order to reduce expense.

There are 83 beds available for tuberculosis, the equivalent of 0.35 beds for each death *per annum* from tuberculosis. The refusal to admit patients who are unlikely to benefit from treatment has led to the opinion amongst the population that admission to hospital means the possibility of cure and admission is now sought after.

The tuberculosis death rate has fallen from 3.19 per 1,000 in 1889-93 to 0.9 in 1929-33 in the colony as a whole. It is thought that the high figures 50 years ago resulted from the previous setting free of the large numbers of slaves, since in 1847 only 29 cases of pulmonary tuberculosis (and those were persons not born in the colony) were found in 1 400 post-mortem examinations, whereas in 1902-5 tuberculosis was the cause of death in 25 per cent. of post-mortems on mainly indigenous Negroes.

The aboriginal Indians now show the highest death rates, and the Negroes are next. The Portuguese shopkeeping class shows fairly high rates and the East Indians and Chinese the lowest. The disease is more caseous in the Negroes than in the East Indians, in whom it tends to be fibrous. Graphs of attack rates are shown and demonstrate that age incidence is earlier in the Negroes than in the East Indians, and also that males and females are approximately numerically equal in the Negroes, but that in the East Indians males greatly outnumber females.

Overcrowding is the rule and the general diet is deficient in proteins and fat soluble vitamins.

In 96 of 538 necropsies seen or performed by the author tuberculous lesions were found, causing death in 85. In 42 tuberculous Negro adults 2 instances of healed foci, 3 cases of childhood type and 9 cases intermediate between childhood and adult type were found. The

remainder were of adult type but showed lesions predominantly acute and caseating with very little evidence of extensive fibrotic changes except in three cases. All presented cavities with ragged necrotic walls.

In 15 of the 21 East Indian adult cases tuberculosis was the cause of death and in 9 of these the adult type was found and a considerable degree of fibrosis was present in all but two. In 11 of the 12 adult Mixed Race cases tuberculosis was the cause of death and in 8 it was of the adult type with marked fibrosis in 3.

In 17 of 103 necropsies on children tuberculous lesions were found, causing death in fourteen. The heaviest death rate was in those children under four years of age. The author calls attention to the similarity between the incidence and mortality figures in his (admittedly small) series and those of BLACKLOCK in the series of 1 800 necropsies performed in Glasgow [see *Bulletin of Hygiene* 1933 Vol. 8 p 44]. Five of these children (all Negroes) died from peritoneal tuberculosis but as the consumption of cow's milk is unknown among their class the infection was probably due to infected food or dust gaining access by the alimentary route.

To determine the course of pulmonary tuberculosis notes on 200 cases were analysed. A history of contact was obtained in 63 but this figure is probably too low. The age group of heaviest incidence was 20-39 years sputum was almost invariably positive and most of the patients were in stage III. The predominant symptom was cough and haemoptysis was seen in 23 of 116 Negroes 10 of 45 Mixed Race and 2 of 20 East Indians. It was usually slight in amount except in the Mixed Race group. The time of survival after notification was shorter and evidence of fibrosis less frequent in the Negroes than in the others. Of 17 children suffering from pulmonary tuberculosis 11 gave a history of contact 8 recovered 7 died and in two the prognosis was doubtful. As far as the ultimate results are concerned the pulmonary tuberculosis of childhood follows the same course in Negro children as in White. Of the 8 who recovered, 3 were cases of epituberculosis and 5 of pulmonary disease.

Collapse therapy was given to 42 patients with open pulmonary disease. Artificial pneumothorax alone was performed on 31 phrenic evulsion alone on 8 and the combined methods on 3. Complete collapse by pneumothorax was obtained in 7 instances pleural adhesions were common in the Negroes who formed the bulk of these patients. Of the 42 two-thirds were improved at the time of the writing of this paper and complete arrest was obtained in two patients treated by phrenic evulsion alone. The period of time over which collapse therapy has been administered is not claimed to have been enough for a true estimate of the results (it was commenced in May 1933) but the fact that improvement was obtained despite lack of proper accommodation, adequate staff and after-care facilities shows that such treatment can be used with advantage in coloured races. It was not uncommonly found that patients failed to attend regularly for refills. If visits by Health Visitors or dispensary physicians failed to ensure regularity the threat to withdraw all attention was successful in inducing the patients to attend.

Treatment by gold salts and sodium morrhuate was found to give disappointing results.

Only 2 per cent. of the annual notifications were due to tuberculosis of bones and joints. Three per cent. of the cattle and pigs slaughtered



have been condemned on account of tuberculosis since 1924. All milk for human consumption is boiled before use. The author therefore considers that it is doubtful if any of the bone and joint cases are due to the bovine type of *Mycobacterium tuberculosis*.

[This account brings out the principal points in the tuberculosis of Native Races, the importance of contact examination, the comparatively rapid but by no means always fulminant course of the disease and the fact that with the application of modern methods of treatment properly organized, a great deal can be done to help these patients. It should be read in conjunction with the two articles by the author in this *Bulletin* 1937 Vol 34 pp 743 and 819] C IV

- i. NEUMANN (C Z) Treatment of Undulant Fever with Protosil.—*Brit Med J*. 1938. Aug 13. pp 342-344
- ii. PETZELAKIS (M D) Abortivbehandlung des Maltafiebers durch Protosil [Treatment of Malta Fever with Protosil].—*Deut Med Woch* 1938 Aug 5 Vol 64 No 32 pp 1147-1148
- iii. BLUMGART (Herrman L) Recovery of a Patient with Undulant Fever treated with Sulfanilamide.—*J Amer Med Assoc* 1938 Aug 6 Vol 111 No 6. pp. 521-523 With 1 chart.

i. Twenty cases of undulant fever were treated. Four were given intramuscular protosil, 5 cc. on alternate days. The results were meagre in three but in the fourth the duration of the disease was materially curtailed. The author concludes that the intramuscular dosage was insufficient. Sixteen further patients were treated with protosil red orally. They were mostly children in the acute stage and in all the serum reaction to *Br. melitensis* was strongly positive. The initial dose for children was 4 tablets daily for youths and adults 6 tablets daily. This was gradually reduced to 2 tablets for children and 3 for adults, daily by the end of the first week. It is advisable to give the drug for several days after the patient has become afebrile.

In 15 of these 18 cases the results were excellent in one no benefit was found. The author concludes that if further experience of protosil red or other sulphanilamide preparations confirms his results in both acute and chronic cases, this treatment will be ideal for undulant fever.

ii. The author used protosil for the treatment of a patient with brucellosis of 3 months duration whose serum agglutinated both *Br. melitensis* and *Br. abortus* in 1 in 1000 dilution. The dose was 5 cc. protosil soluble daily for 10 days by intramuscular injection and simultaneously (for 20 days) 3 tablets daily by mouth. After an interval of 7 days again 3 tablets daily for 20 days. After a second interval of 10 days, again 3 tablets daily for 10 days.

The result was strikingly good though the serum reaction was positive 1 in 800 three months later.

iii. The patient, aged 33 gave a history of 3 weeks illness. His serum reaction was positive for undulant fever in a dilution of 1 in 3000 and brucella was cultivated from his blood. He was given 5 gm. sulphanilamide orally on the first day of treatment, 4 gm. on the second and third days, 1.6 gm. on the fourth and fifth days, 4 gm. on the sixth day 5 gm. on the seventh and eighth days, and 6 gm. on the ninth day after which the treatment was discontinued. The temperature was normal from the eighth day onwards and remained so during the

*Summary of Reports in Literature to March 1938 on Effectiveness of Treatment of Undulant Fever with Sulfanilamide or its Derivatives*

Author	Number of Cases	Agglutination Titer	Blood Culture	Duration of illness before Treatment, Weeks	Duration of Treatment with Sulfanilamide or its Derivatives, Days	Time of Disappearance of Fever after Institution of Sulfanilamide, Days	Period of Freedom from Symptoms to Time of Report of Various Authors, Months
Grouès*	2	0 Brucella melitensis 1 400 Brucella melitensis 1 800	0 0 0	? 2 3	26 26 70	26 26 44	2+ 2+ ?
Thévenet	1	Bang Bazillen 1 2,500	0	25	30	12	4
Borger	1	+ Brucella melitensis 1 1 200	0	5	7	7	1+
Suchler	1	Br abortus 1 400	+	4	30	26	
Béthoux et al	1	Br abortus 1 2 500	0	6	28	7	3
Ahringmann	2	Br abortus 1 2 500 Br abortus 1 12 500	0 0	5 1	20 3	4 9	4 1
Lloyd	1	Br abortus 1 1 500	0	1	11	8	4+
Richardson	3	0 Br abortus 1 800 Br abortus 1 1 600	0 + 0	20 7 5	9 6 5	6 7 5	2+ 3+ 6 4
Francis	3						

\* In addition to these two cases Grouès reports good results in eight cases from combined treatment with vaccine and sulfanilamide. This author also refers to an unpublished good result attained by Coronat, a colleague with sulfanilamide in one case of undulant fever.

† One relapse four weeks after first attack promptly responded to sulfanilamide.

6 months since discharge from hospital. Blood culture was negative two days after cessation of treatment.

The author gives the above table of cases treated with sulphanilamide or its derivatives recorded in the literature.

[In addition PUNCH (*Lancet* 1938, Aug 20 p 429) records successful treatment of one case in England with sulphanilamide and quotes a similar case treated by MATTHEWS (*Brit Med J* 1938 Feb 28 p 483)]

C IV

ORISSA. ANNUAL PUBLIC HEALTH REPORT OF THE PROVINCE OF ORISSA FOR THE YEAR 1936 AND THE ANNUAL VACCINATION REPORT FOR THE YEAR 1936-37 [VERGHESE (G.) Director]—  
Outbreak of Jhin-Jhinla. p 17

In February 1936 an outbreak started in the Balasore district of Orissa Province and in the ensuing four months cases were reported from other districts—Cuttack Puri and Ganjam. The condition was what is known as jhin-jhinla and more than three thousand cases were reported from Balasore. Females were attacked in greater number than males. The chief symptoms were tingling in the soles a sensation of pressure in the head, perhaps with headache and a general tremor [For more details see this *Bulletin* 1936 Vol 33 p 721]. It is thought to be hysterical in nature or allied to hysteria. There were no fatalities ascribable to it but its presence led to a state of panic among the inhabitants.

H H S

JAMES (Chifford S.) Tropical Phagedaenic Ulcer in the Pacific.—  
*Trans Roy Soc Trop Med & Hyg* 1938 Apr 20 Vol. 31  
No 6. pp 647-666 With 5 figs. (1 map) [10 refs]

An admirable account of this condition in the South Seas, based on the study of 862 cases admitted to hospital in New Britain (808 cases) and the Solomons.

The author notes the striking correlation between the bacteriological findings of the smear and the clinical state of the ulcer. He inclines to the belief that the fusiform bacillus and the spirochaete are actually one organism. A healed ulcer remains a liability for the scar tissue most abundant in slow healing diminishes the blood supply to the new skin, and contains in its interstices dormant organisms while the blood vessels in the area suffer an obliterative endarteritis. The scar tissue therefore, easily breaks down. "If surgical interference is necessary to bring about healing as much as possible of the scar tissue should be removed."

He adduces striking evidence for the part played by defective nutrition notably the occurrence of an epidemic of ulcer in a starved community when surrounding villages were unaffected, and two schools, for boys and for girls graphs for which show the rise in ulcer rate after periods of food scarcity. The schools were under his care for three years. Two areas of the British Solomons are compared with one in New Britain. All other conditions were similar but in the Solomons there was plenty of good food while in New Britain for various reasons the people were underfed. In the former there was only one death from this cause in

4½ years in New Britain it was the chief cause of mortality (here one third of the patients were under 8 years) Finally the ulcer months follow the north west monsoon a period of precarious food supply when fishing is impossible In 1937 when the monsoon was delayed for six weeks there was a corresponding delay in the ulcer period As to the vital element which is lacking in the food he thinks that this must be suitable protein and he notes that where fish is freely eaten ulcers are rare He considers that there is a definite relation between malaria and phagedaenic ulcer He can recall nine white patients with this disease all of whom had had malarial attacks but none in non malarious whites. Buxton's line of separation between malarial and non malarial Pacific islands marks also the division between phagedaenic ulcer islands and ulcer free islands The spleen of the average ulcer patient is larger than that of the average general population by an amount equal to one-third of the distance between costal margin and umbilicus. Rennell island was in 1930 and 1933 free from malaria and phagedaenic ulcer (LAMBERT) in 1936 both these diseases were present (CRITCHLOW)

For curative measures the paper must be consulted. Many practical points are given. He starts with a caustic such as McGuire's [see this *Bulletin* 1936 Vol. 33 p 154] For larger ulcers he advocates excision and skin grafts immediate or delayed. He has thus treated 293 cases. Scar tissue should be whittled away until as nearly as possible normal tissue is reached. Any concomitant malaria or dietary deficiency must be treated

[CLEMENTS paper also deals with this region and should be read (see this *Bulletin* 1937 Vol. 34 p 436) He found no relation between the splenic index and incidence of ulcer]

A G Bagshawe

GUNTHER (Carl E. M.) The Copper Sulphate Treatment of Tropical Ulcer and New Guinea Mouth Disease.—*Med Jt Australia* 1938 Feb 19 25th Year Vol. 1 No 8. pp 348-350

Tropical ulcer and New Guinea mouth disease differ only as to the site of occurrence each is fundamentally due to food deficiency each presents as a foul sloughing ulcer from each can be isolated a spirochaete and a fusiform bacillus and each responds readily to the same form of treatment

Two types of tropical ulcer occur in New Guinea, one on the foot and leg such as is common throughout the tropics the other in the distal half of the terminal phalanges of fingers and toes. The tip of the digit sloughs leaving the nail attached below which is seen the tip of the phalanx

New Guinea mouth disease starts on the gums and extends to the cheek. It begins as a marginal gingivitis which affects the teeth sockets bone sequestra may form. Later the cheek becomes perforated. There may be erosion of blood vessels sloughing of uvula perforation of soft palate. Among indentured labourers on a liberal diet with plenty of vegetables both conditions are rare. When the diet consists of rice and tinned meat they are common. Local treatment is the application of copper sulphate which may be regarded as specific. A solution of 1 in 150 is used a level teaspoon of the crystals to the standard New Guinea medicine bottle of 28 ounces. It is applied to leg ulcers as a wet compress to digital ulcers as a

continuous bath and in the oral form as a mouth-wash.\* If grafts are needed to hasten healing, the skin to be grafted should be prepared by the application of copper sulphate compresses for two days. In the digital form when the tissues have become healthy amputation is needed. In the oral form the solution can be freely used—no constitutional effects have been seen. If the mouth cannot be closed a syringe is employed. Teeth however loose must not be extracted till all is quiet. A liberal vitamin-rich diet is essential.

Tribute is paid to one Muru, a hospital orderly, who discovered that the application of copper sulphate to a healing ulcer prevented relapse and later succumbed to erosion of a vessel in the oral form of the disease.

A. G. Bagshawe

DURAN (Pedro) Notes on the Treatment of Ulcers of the Legs.—*Monthly Bull Bureau of Health Manila* 1938, Feb. Vol. 18, No. 2, p. 55

Neocarsphenamine though specific for frambœsial or syphilitic ulcers of the legs, has practically no effect on septic and tropical ulcers, which constitute the majority found. The treatment advised for these is—

1. A mild antiseptic solution followed by the application of zinc oxide-ichthyol ointment (or a compress of 10 per cent solution of magnesium sulphate renewed every two hours)

2. When the inflammation has almost disappeared, apply a compress of 1 per cent picric acid, renewed daily.

3. When after several days of these measures healthy granulations appear apply a zinc plate over the ulcer. This should extend a little beyond the borders of the ulcer and the whole should be covered by a wide strip of plaster. Leave untouched for a week or more. Epithelial growth is rapid and without any other treatment the ulcer finally heals.

C. H.

SUTTON (Richard L.) Jr. A Case of Inherited Albinism-like Hyperkeratosis.—*Arch Dermat & Syph* 1938, July Vol 38, No. 1 pp. 28-31 With 1 fig. [10 refs.]

The patient, a white boy aged 3½ in Kansas, showed transversely grooved hyperkeratoses underlying the interphalangeal joints of both great toes. They became inflamed in summer when he went barefoot, but healed in winter when shoes were worn. His mother had had identical trouble, with the same variations according to whether shoes were worn or not in her youth. No other toes or fingers were affected and no other areas of hyperkeratosis were present. Radiologically it was found that the terminal cancellous tufts were absent and the distal phalanges were shorter than normal. The lesions were exactly similar to those of early anhidrosis.

Details of the treatment of leg ulcers are given as follows—

The compresses are of lint soaked in the solution, applied without being wrung out and lightly bandaged. These are renewed every four hours until the slough separates. Once this has occurred they are changed only night and morning but in the intervals the compress is moistened with the solution whenever it becomes dry. This is continued until the ulcer has almost filled with healthy granulation tissue when scarlet red ointment and adhesive stripping are applied. The granulation tissue is always covered by a greenish-black layer which can easily be removed, although removal is not necessary.

\* Under this régime the slough will separate within thirty-six hours, leaving a firm, clean floor."

The hyperkeratosis probably originated as a result of the weight being taken on the interphalangeal area owing to the short distal phalanx rather than on the pad of the toe. Bending of the joint then tends to occlude the blood supply but this bending is prevented by wearing shoes.

This exposition of the source of one case of ainhum perhaps may be applied to many cases. The author excludes all amputations due to leprosy, scleroderma etc. from the category of ainhum and accepts the description of HYDE and MONTGOMERY C IF

MARSH (F) Heat-Stroke and Heat-Exhaustion.—Reprinted from *Brit Encyclopaedia of Med Practice* 1937 Vol. 6 pp 396-415 [87 refs.] [Summary appears also in *Bulletin of Hygiene*]

This account of heat-stroke and heat-exhaustion especially as regards the important measures necessary in prophylaxis, should be found very valuable wherever heat disorders are likely to arise—in industry and in hot climates. From the pathological and clinical aspects the scope of the paper might perhaps have been widened to include the serious cases that have been reported following the therapeutic use of hot and humid air as in the Kettering hypertherm.

One statement of Dr Marsh's requires modification. He is not correct in stating that it is the policy of the Witwatersrand Gold Mines to ignore air-conditioning completely and to depend entirely on fitness and good acclimatisation of the workers. The position is of course that adequate ventilation and comfortably cool (sometimes too cool) conditions are provided throughout a great part of most mines. It is at the working face that extreme conditions are encountered owing to the high degree of humidity maintained as a silicosis-preventive measure and owing also to the engineering difficulties involved.

However Dr Marsh gives a survey which embodies most that is definitely known about heat-stroke which in a number of important features is still rather an obscure subject and for which, as he points out curative measures cannot yet be said to be altogether effective

J S Heiner

SUDIBYO (R M Slamet) Twee gevallen van huidmellioidosis. [Two Cases of Cutaneous Mellioidosis].—*Geneesk Tijdschr v Nederl-Indie* 1938 June 14 Vol. 78. No 24 pp 1424-1444 With 4 figs on 2 plates & 1 text fig [14 refs.] English summary [Summary appears also in *Bulletin of Hygiene*]

Few cases of cutaneous mellioidosis have been recorded and the occurrence of two such cases in Java is made the occasion for a commentary on the condition. The patients were men of 60 and 55 years of age respectively and the chronic lesion was distributed over the leg and on the foot. Both are said to have been traumatic in origin. The nature of the injury is not stated in the first case in the second an ulcer followed penetration of a fragment of bamboo between the fourth and fifth toes. They suffered from no loss of appetite no emaciation no cough no pyrexia and no urinary disturbance. It was a chronic lesion in both cases developing after trauma malodorous suppurative superficially ulcerative tending to serpiginous spread, covered with crusts and showing abundant white scarring where

which had taken place. Various tests were applied to exclude phyllo, tuberculosis, dermatomycosis, leishmaniasis and chronic pyogenic dermatitis. A very striking proof of the causation of the infection by *Pf. whitmorei* was the ability to isolate this bacillus from 1 over the lesion in practically pure culture. Cultures from blood, sputum and urine were entirely negative but serum-agglutination tests were positive at 1 in 400 and 1 in 800. The condition spread slowly by formation of abscesses in the upper layers of the skin with resultant necrosis, colliquescence and absorption. Exacerbation was frequent. Excellent plates accompany the article and these give a very good idea of the cutaneous appearance. It is rather surprising that this type of meliodosis proved comparatively easily curable by the application of 10 per cent tincture of iodine after the removal of crusts. A 10 per cent salicyl ointment was applied also for its keratolytic action.

W P Harvey

JONES (E. R. J.) KOUWENAAAR (W.) & WOLFF (J. W.) Mycetoma pedis (Madura foot). [Madura Foot].—*Geneesk. Tijdschr. v. Nederl. Indië*, 1933, July 5 Vol. 78 No. 27 pp. 1606-1613. English summary.

The interest of this case lies mostly in the fact that the infection must have been contracted locally and is, therefore, the first autochthonous case reported from the East coast of Sumatra. The patient was a Punjabi who had been resident in Sumatra for 19 years when the symptoms first declared themselves, a year before he was seen by the author. A *Maduraella* with black grains (*P. M. americana*) was isolated. Three cases have been recorded previously in the Netherlands Indies, but the infection in these might have been contracted elsewhere.

This patient refused operation and was treated by intravenous injections of 10 per cent. sodium iodide in doses of 25 cc. Fifty injections were given in the course of about eight months and cure is said to have been complete.

H H S

LACAZ (Carlos da Silva) Chromomycoses.—*Brasil Medico*, 1933, June 11 & 18 Vol. 52, Nos. 24 & 25, pp. 555-580, 578-583. With 6 figs. [33 refs.]

This is a general account of Chromomycoses or Chromoblastomycoses as met with in Brazil. It starts with historical references to the first case reported in São Paulo by Alexandrino Padroso and José Maria Gomes in 1911 due to *Homodendrum*, the species *pedrosoi* being named by Brumpt in 1922. Subsequent records of other cases caused by other species and by *Phialophora verrucosa* and *Acretheca* are given. The geographical distribution of 48 cases noted up to July, 1933 shows that 30 were seen in São Paulo, 8 in Minas Geraes, 4 in Rio de Janeiro, 3 in Pernambuco, 2 in Bahia and 1 in Goyaz. The clinical appearances are described with photographs not well reproduced. The diagnosis by macroscopical means and by culture is discussed and the histological changes produced, ending with a consideration of the individual species of fungi associated and a note on treatment, which is essentially surgical. The article is useful as a summary though nothing fresh is recorded.

H H S

LOEWENTHAL (L. J. A.) Multiple Idiopathic Hemorrhagic Sarcoma of Kaposi. Report of a Fourth Case in a Full-Blooded Negro — *Arch Dermat & Syph.* 1938. June Vol. 37 No 6 pp 972-974 With 1 fig

Kaposi's disease—multiple sarcoma of the skin—would appear to be rare among negroes. JOJOT and LAIGRET reported a case in the Cameroons in 1922 [see this *Bulletin* 1924 Vol. 21 p 16] PARDO-CASTELLO one in Cuba in 1931 ELLIS one in an American negro in 1935 the present record of a case in Uganda is the fourth. The patient was a native of Bunyoro aged 45 years. Seventeen months before coming for treatment he had noticed a nodule on the right external malleolus later others had appeared. There had been a little pain in the joint but the reason for seeking advice was the excessive bleeding when the nodules were injured. When seen by the author there were about a dozen of these on the foot and ankle each about 1 cm. in diameter sessile firm smooth and not tender. The foot as a whole was oedematous and between the nodules the skin was roughened and scaly (see figure). Histological examination of a nodule revealed the structure of an endothelioma.



Sarcoma of Kaposi in a Negro. The foot is oedematous, and the skin between the nodules is rough and lichenified and shows smooth pigmented scars.

[Reproduced from the *Archives of Dermatology and Syphilology*

H H S

YOUNG (W. A.) & HAWKING (F.) Idiosyncrasy to Acriflavine — *Lancet.* 1938 June 4 pp 1275-1276

A dressing consisting of a plug of gauze soaked in 1/2000 aqueous solution of acriflavine and a covering pad similarly soaked produced, on the third day after application, a swollen erythematous and painful



urea corresponding exactly with the dressing, on the arm of an Indian patient treated for a chronic ammus in Dar-es-Salaam. Blistering was produced in places. To confirm that this condition was due to the acriflavine a small pad of gauze soaked as before was strapped to the healthy skin of the forearm, and again erythema and inflammation began to appear after two days. The patient stated that this rash had appeared before when similar "yellow medicine" had been applied in other places, and the authors therefore conclude that the reaction was probably not confined to one brand of acriflavine.

Acriflavine is one of the commonest dressings used, but no other similar sensitivity has been observed by the authors. C 11

HABIG (J. M.) *Maladie professionnelle des coupeurs de fruits. Ulcère traumatique de la cornée chez le noir* [An Occupational Hazard in Fruit Cutters].—*Ann. Soc. Belges de Méd. Trop.* 1938. Mar 31. Vol. 18. No. 1 pp. 57-61 [Summary appears also in *Bulletin of Hygiene*]

Natives employed in the collection of the fruit of the palms in the provinces of Léopoldville and Coquilhatville in the Belgian Congo are exposed to injuries of the eye which should be regarded as legitimate occupational hazards. The injuries are caused by the points of palm leaves black in colour which cut or scratch the cornea or conjunctiva. These points are sharp and hard and have a cutting edge. The points are at the ends of the leaves, and the dead leaves hang down close to the trunks of the trees up which the workers climb.

The author believes that these injuries are not due to carelessness on the part of the workers and explains that when a long thin object is pointed towards the eye, the exact distance of the actual point of that object from the eye is most difficult to estimate. The eye estimates the distance of the principal mass or most clearly seen part of the object which is not usually its point. He illustrates his argument by showing the difficulty in quickly estimating the distance of the point of a sword directed towards the eye and by quoting the traffic regulation which requires that a rag be attached to the end of planks or other thin objects carried on and projecting behind lorries, which otherwise are a danger to following motor-cyclists. The difficulty is increased when monocular vision only is possible, which is often the case when these native workers, climbing the palms, encounter dozens of these points simultaneously. Reaction time is important and the author claims that the light and convergence reflexes of natives are slower than those of Europeans.

Clinically the right eye is more often affected than the left on account of the usually more vigorous head movements to the right than to the left in climbing. Erosions, cuts and scratches are seen. The eyeball is rarely punctured, but Descemet's membrane is frequently touched, with all the consequences of that accident. The ulcers do not tend to spread, and heal rapidly but leave opacities which, being usually central, often interfere with sight and may produce blindness. Traumatic cataract and hypopyon are noted as complications.

A piece of mosquito gauze 7 x 20 cm. with an aperture for the nose, and fastened by elastic round the head, will serve to prevent this accident. C 11

BURNET (F M) & FREEMAN (Mavis) The Rickettsia of "Q" Fever Further Experimental Studies.—*Med J Australia* 1938 Feb 12. 25th Year Vol 1 No 7 pp 296-298. With 1 fig [Summary appears also in *Bulletin of Hygiene*]

Additional evidence is brought to show that Q fever is caused by a Rickettsia. Mice were inoculated directly with the blood of a patient on the fifth day of illness. Two of the animals killed 13 days later were found to be harbouring rickettsiae in the spleen. Infection was propagated to further mice without difficulty. The organism produced typical febrile reactions in normal guinea-pigs but not in immune guinea-pigs. In some mice enormous numbers of rickettsiae were found in the spleen. Advantage was taken of this observation to prepare by differential centrifugation suspensions suitable for agglutination. Agglutinins were found up to a titre of 1/400 in experimentally infected monkeys and up to the same titre in the serum of patients suffering from the disease. The titre however seemed to vary greatly in different animals and in different patients. At times no agglutination occurred, or only in very low titres such as 1/2 or 1/4. It is believed however that the agglutination test will prove of value in epidemiological studies. Finally evidence is brought to show that the Rickettsia of "Q" fever is different from the virus of psittacosis [see also this *Bulletin* 1938 Vol 35 pp 62-63] G S Wilson

MOHR (Werner) Zur Frage der Myositis tropica. [The Question of Myositis tropica.]—*Arch f Schiffs u Trop Hyg* 1938. May Vol 42. No 5 pp 222-226 [30 refs]

The case is described of a man who in 1929 went to Liberia and Cameroon where he had malaria, a Loa filaria in the eye and a Calabar swelling on the hand. In 1936 he had boils on both arms and before healing was complete painful muscle abscesses in the calf and lumbar region. The pus evacuated contained *Staphylococcus albus haemolyticus* as did that of two muscle abscesses which developed later no trace of filaria in any. The case and the literature are discussed and though filaria is excluded as a direct cause it is thought to be a possible predisposing one by trauma to the muscles as CHESTERMAN has suggested. In this instance the boils were a direct antecedent.

Pathologically there is no difference between tropical and non-tropical myositis. A G Bagshawe

OOMEN (H. A. P. C.) & KIRSCHNER (L.) Endemisch sclerom in een Minahassisch dorp [Endemic Scleroma in a Minahassa Village.]—*Geneesk Tijdschr v Nederl Indië* 1938 May 3 Vol 78. No 18 pp 1032-1057 With 1 map 2 text figs. & 16 figs. on 4 plates. [11 refs] English summary

Minahassa is a northern residency province of the island of Celebes in the Netherlands Indies. A survey of a remote village with 1 100 inhabitants in this province was made for endemic rhinoscleroma by examining individuals with ear nose or throat disease. Twelve undoubted and two doubtful cases of this disease were detected and confirmation obtained by the demonstration of typical *Klebsiella scleromatis* bacilli in nasal smears. Complement fixation reactions and

histological examinations were also positive. Nine of the patients were not yet 22 years old but the disease did not always show itself in deformities, for in 11 cases "the process was scarcely to be detected outwardly" [see also this *Bulletin* 1937 Vol. 34 p. 433]

W F Harvey

DEL VECCHIO (Pasquale) Sopra un caso di streptotricosi del polmone [A Case of Pulmonary Streptothricosis].—*Ann. di Med. Nov. e Colon.* 1938. Mar-Apr Vol. 44 No. 3-4 pp. 126-128.

The patient was an Italian male aged 37 born in Eritrea. He was admitted to hospital in Asmara with signs of left lobar pneumonia, which resolved in a few days, but was followed by a period of about three months of slight evening fever (37.5°C.) with cough, thick sputum streaked with blood, night sweats and asthmatic symptoms. Radiological examination showed nodular shadows at the left apex, small thin walled subclavicular cavities and beneath these an ill defined area of consolidation. The lower zone and diaphragmatic movements were normal.

*Myc. tuberculosis* could not be found in the sputum but ramified mycelial elements were seen which on culture appeared to belong to the *streptothrix* group. Treatment with large doses of potassium iodide cured the condition in three months.

The author points out the similarity between this clinical picture and that of pulmonary tuberculosis the differential diagnosis resting on the culture of the organism from the sputum. Eighteen cases only have been reported in the literature. [Such organisms are now classified as *Actinomyces*]

C H

CARRIÓN (A. L.) Actinomyces in Puerto Rico.—*Puerto Rico J. of Public Health & Trop. Med.* 1938. Mar Vol. 13 No. 3 pp. 367-382. With 10 plates [16 refs.] [Spanish version pp. 383-398.]

This paper deals with the first two cases reported in Porto Rico of a generalized actinomycotic infection, one with an original pulmonary lesion. The pathological details are given and cultures of the causal organisms were made. Typical granules were found in the tissues and exudates of the one case and in the exudates only of the other. In both instances the anaerobic form *A. bovis* Wolf (Israel) was isolated. Numerous good micro-photographs are appended. Animal experiments with the two cultures yielded negative results.

D Erikson

BIDWELL (R. A.) The Differential Diagnosis of Prolonged Pyrexia in India.—*J. Roy. Army Med. Corps* 1938. July Vol. 71 No. 1 pp. 23-30.

ESCOMOT (E.) La maladie de Carrion ou verruga du Pérou. Les dernières acquisitions [Recent Work on Verruga Peruviana].—*Bull. Soc. Path. Exot.* 1938. July 6 Vol. 31 No. 7 pp. 536-554. With 5 figs.

FRÉGONNEAU (Werner) Bericht ueber eine epidemieartig aufgetretene Vergiftung mit einem solaninähnlichen Stoff in der Tanga und in der Nord provinz des Tanganyikagebietes [An Outbreak of Poisoning due to a Solanin-like Substance in Tanganyika Territory]—*Arch f Schiffs- u Trop Hyg* 1938. Aug Vol. 42. No 8 pp 375-379 [Summary appears also in *Bulletin of Hygiene*]

In the Tanga and Northern Provinces of Tanganyika Territory there was an outbreak among the German and Swiss settlers (but not British and Greeks) of a condition which suggested to the author poisoning due to atropine or some similar substance. The symptoms were failure of visual accommodation (especially in young people) dryness of the throat pasty taste in the mouth suppression of saliva swollen tongue and in some cases difficulty in speaking. Two of the many patients complained of tingling in the hands and feet (not in the tips of the toes and fingers) and one had the sensation of walking on nothing. Delay in accommodation and lessened reaction to light were observed in the somewhat dilated pupils.

The author was led to suspect rye bread as the cause of these symptoms and thought that the Kenya grown rye was contaminated with a weed of the nightshade variety. An experiment on two volunteers confirmed the toxicity of the rye but chemical and pharmacological investigation of the meal conducted in Hamburg was inconclusive although microscopic examination disclosed material definitely of *Datura* species which commonly contains scopolamine or hyoscyamine. [Unfortunately no figures of the number affected are given.] C II

MEI (P F) & CHOU (T Q) Two Poisonous Plants, *Huang-t'eng* and *Tsai-chung yao* and their Identification.—*Chinese Med JI* 1938 July Vol. 54 No 1 pp 37-39

The authors received two plants from the legal authorities with a note that they had caused many fatal cases of poisoning in Hunan and Chekiang. Roots and stems were sent and were reddish yellow in colour. Their names were *Huang-t'eng* and *Tsai-chung yao*. They appeared to resemble another *Lei kung-t'eng* previously examined by the authors and further investigation revealed that they all three, belonged to the same genus *Tripterygium* and were very likely identical, *T. wilfordii* Hook. Tripterygine  $C_{20}H_{27}O_3$  and dulcitol,  $CH_2OH(CHOH)_4CH_2OH$  were isolated from all three. This article deals solely with the chemistry of the plants. It would be interesting to have an account of experimental and clinical findings. H H S

ABRAMOWITZ (E William) & SWARTS (William B) Dermatitis due to Cocobolo Wood.—*Arch Dermat & Syph.* 1938. Mar Vol. 37 No 3 pp 441-443 With 2 figs.

Cocobolo wood grown in the tropics is heavy of a reddish brown colour and shows a beautiful grain when polished, and is used for making knife-handles bowls walking-sticks and other purposes. G. M. MACKEE in 1913 first recorded its causing dermatitis. The actual cause seems to be an ether-soluble resinous oil and closely related to that of *Rhus toxicodendron*.

The case is recorded of a man of 42 years, with erythema serous evanescence and scaling on scalp neck arms and popliteal spaces the condition started four months before he was admitted for treatment, when he began to carve a piece of this wood. Not connecting the lesions with the wood he kept on with the work. Patch tests with the sawdust and with an ethereal extract of it were markedly positive with mahogany and pine which the patient also used, the test was negative. He had a tendency to seborrhoea and to sweating which may have pre-disposed him to cutaneous irritation. H H S

KINGSLEY (Daniel M.) Acetone Solvents for Romanowsky Stains. *Jl Lab & Clin Med* 1937 Feb Vol. 22 No. 5 pp. 524-531 [36 refs.]

In spite of warnings commonly given against the presence of acetone in solvents for Romanowsky stains the author found acetone to be a suitable solvent for use with such stains. Reference to original publications failed to show any statement specifically invalidating the use of acetone whereas the efficacy of such stains used with acetone solvents was noted by several workers. The author was able to prepare a good Romanowsky stain from the requisite dyes using no methyl alcohol, but acetone instead. For use with certified Wright's blood stain it was found better to add 10 to 30 per cent acetone to an ordinary methyl alcohol solution of the stain and to allow an extra minute or two for staining to compensate for the dilution thus made.

P H Martin.

BESLER (Carlo) Per la preparazione della soluzione colorante Giemsa. [Preparation of Giemsa's Stain].—*Riv di Malariologia* Sez. I 1938 Vol. 17 No. 2 pp. 162-163 French summary (3 lines)

The author advises that 3.0 gm. Azur Eosin Methylene Blue (sec. Giemsa) Merck be dissolved, in a dark coloured bottle in 375 cc. pure acetone-free methyl alcohol (Merck) and 125 cc. double distilled glycerine (Merck) be added. This should be kept at 37°C. for 14 days being shaken once daily and afterwards at room temperature for 14 days and should then be filtered into a dark glass-stoppered bottle ready for use.

The diluting fluid should consist of

Monopotassium phosphate	1.0 gm.
Di potassium phosphate	2.0 gm.
Distilled water	1,000 cc.

and the proportion of stain to diluent should be 0.4 cc. to 10 cc.

[The use of buffer solutions is also most valuable in the preparation of Ziehl-Neelsen carbol fuchsin, which often loses its intensity fairly quickly if distilled water is used but retains it with these or similar phosphate solutions in the tropics.]

C W

GOLDBERG (Leon Heim) A Rapid Method for staining Blood Smears. A Modification of the Original Wright Technique.—*Jl Lab & Clin Med* 1938 June Vol. 23 No. 9 p. 959

Wright's stain is used and thin films are advised.

1. Cover the smear with the stain, leave on for 10 seconds.

2. Ignite the stain and allow to flame for 10-20 seconds.

- 3 Drop the slide into distilled water
- 4 Remove and dry It is now ready

Only nucleated cells will stain deeply but nuclear material is well shown. Red blood cells are only poorly stained. The method is particularly useful when a differential blood count is called for at once it is as efficient as any other method. [It is not stated whether this method is useful for staining parasites or not. C II

PELLICCIOTTA (Raffaele) Crisi eritrocitaria da clima. 'Erythrocyte Crisis due to Climate. — *Arch Ital Sci Med Colon e Parasit.* 1938. Apr Vol 19 No 4 pp 193-222.

The experience of the author in the Harar district of Italian East Africa led him to recognize in Italians newly arrived in that country a syndrome which he claims has not previously been recorded. The condition occurs within a month or two of arrival and consists of asthenia headache vertigo tinnitus general and articular pains loss of appetite and some digestive disturbance. The pulse is small, rapid, and soft. At the same time the erythrocytes are reduced in number sometimes to as low as 4,200 000. The colour index remains normal and the leucocytes do not show any variation which can be regarded as abnormal.

The duration of the condition may be as long as 8 months but the prognosis is good. Recovery from the subjective symptoms is accompanied by a return of the blood count to a normal of, usually over 5 million. Liver treatment has had some beneficial effect, but apart from rest other treatments have not been found to be of great service.

The author ascribes the condition to the effects of sudden change from a temperate to a tropical climate at a high altitude. He was not able to find any other causative factor. Details of 20 cases are given. C II

HADEN (Russell L.) Diffraction Methods for measuring the Diameter of the Red Blood Cell.—*Jl Lab & Clin Med* 1938. Feb. Vol 23 No 5 pp 508-518 [17 refs.]

Although cell diameter is not invariably an accurate indicator of cell volume since in certain macrocytic hypochromic anaemias there may be no reduction or even an increase in diameter with a marked decrease in volume while in congenital haemolytic icterus the cells tend to be spherical, knowledge of the mean cell diameter is however a valuable addition to blood study. Direct measurement of a sufficiently large number of cells is so laborious that for clinical purposes diffraction methods are generally utilized, and a number of diffraction instruments have been introduced.

PIJPER suggests that his instrument in which the abnormal film can be compared directly with a normal, may be used qualitatively as well as quantitatively. The mean diameter is determined by measuring the diameter of the yellow ring. The greater the number of macrocytes, the smaller and more intense the violet ring whereas an increase in microcytes results in a large red ring. The distance between the violet and the red rings measures the degree of anisocytosis. He differentiates three types of patterns which are summarized in the present paper as follows —

Type I Violet, red, and yellow rings all small. Distance between violet and red rings relatively large. This pattern means macrocytosis

and pronounced microcytosis (sic) typical of pernicious anaemia [“microcytosis” is obviously a misquotation. Pijper wrote anisocytosis.]

Type II Yellow ring of normal diameter which means normal mean diameter of cells. Violet ring is smaller and red ring is larger than normal, indicating more anisocytosis than normal. The distance between the violet and red rings measures the degree of anisocytosis.

Type III All rings larger than normal and distance between violet and red rings often relatively increased. This is typical pattern of congenital haemolytic xerosis (spherocytic anaemia) and the microcytic anaemias due to iron deficiency.

Emmons's instrument consists of two simple telescopic tubes one carrying the light and the other the blood film, the distance between which, for a fixed size of red halo is calibrated to express the diameter of the cells.

In Bock's apparatus the light passes through two apertures so that a blood film placed in the beam produces two spectra. A sleeve is adjusted until the outer red bands of the two spectra touch tangentially as in Eve's halometer.

Using Emmons's Pijper's or Bock's apparatus the author finds the results check closely with direct measurements excepting in the case of the Bock instrument with very large or very small cells, when the results tend to deviate towards normality. The readings are the same with stained or unstained films with the Emmons or Bock instruments but with the Pijper instrument the diameter measures about  $0.8\mu$  less on a stained film than on an unstained film. Emmons's instrument has the advantage of portability and not requiring a dark room. Pijper's is excellent for comparing an abnormal with a normal film and also indicates the degree of anisocytosis as well as the mean diameter.

F Murgatroyd

SANKARAN (G.) & RADHAKRISHNA RAO (M. V.) Haematological Investigations in South India. Part III. The Mean Red Cell Diameter — *Indian Jl Med Res* 1938. Apr. Vol 25 No 4 pp 931-955 With 1 graph.

Diffraction methods for measuring the erythrocyte diameter may give fallacious results with blood films showing extreme anisocytosis or poikilocytosis, and from a critical and scientific standpoint the value attached to the results is sometimes scarcely justified. On the other hand the time consumed by the original Price-Jones method is a serious disadvantage. The authors find, however that 500 cells can be measured in less than an hour by a modification of the method of Hynes and Martin, in which the image of the cells is projected on a horizontal ground glass screen at a fixed magnification and the diameter ascertained by superimposing a celluloid film calibrated with a number of graduated circles.

The results of examining 25 normal healthy South Indians, of whom 10 were women, are summarized as follows. Mean diameter of R.B.Cs. =  $6.85\mu$  range of value of mean diameter =  $6.27\mu$  to  $7.38\mu$  standard deviation =  $0.28\mu$  Coefficient of variation = 4.1 per cent. The mean erythrocyte diameter for these South Indians is decidedly lower than the figure for Europeans given by Price-Jones (mean  $7.202\mu$  with a range of  $6.661\mu$  to  $7.492\mu$ ). At present no reason for this difference can be suggested.

F Murgatroyd.

RADHAKRISHNA RAO (M V) Haematological Investigations in South India. Part IV Haemoglobin in Normal Pregnancy.—*Indian J Med Res* 1938 Apr Vol. 25 No 4 pp 957-969 With 2 figs. [19 refs.]

The haemoglobin values of 100 women with uncomplicated pregnancies were compared with those of 100 non pregnant women in Coonoor South India. The women of both groups belonged to the poorer classes and their diet was probably relatively deficient in quality and quantity milled rice being the main ingredient supplemented by small quantities of pulses vegetables and condiments while milk meat and eggs were eaten in negligible amounts or not at all.

The mean haemoglobin level in the pregnant group was 15.52 gm per 100 cc blood, and in the non-pregnant group 15.81 gm per 100 cc blood the difference was not statistically significant. There was no correlation between age and haemoglobin level in either the pregnant or the non pregnant groups and no correlation could be found between the haemoglobin value and the number of previous pregnancies or the duration of pregnancy. Discussing the iron requirements it is pointed out that menstruation may make greater demands than pregnancy and the results showed that in uncomplicated pregnancy there was no appreciable lowering of the haemoglobin level. The figures obtained for both groups are higher than those reported by other workers in India and this appears to be due to the fact that Coonoor is about 6 000 ft. above mean sea level.

Incidentally the authors point out that technical methyl alcohol (methanol) was quite satisfactory for the preparation of Leishman stain and is only one-tenth as costly as the pure methyl alcohol ordinarily used.

F Murgatroyd

SANKARAN (G) & RAJAGOPAL (K) Haematological Investigations in South India. Part V The Effect of Altitude on Haemoglobin Content.—*Indian J Med Res* 1938. Apr Vol. 25 No 4 pp 971-977 With 1 chart [11 refs.]

Since a considerable part of the inhabited area of India is plateau or mountain the authors examined the effect of altitude on the haemoglobin value of 38 British soldiers drafted to Wellington (6 000 ft) in the Nilgiri Hills from Madras (sea level).

Unfortunately figures were not obtained prior to the journey from Madras but previous investigations of 125 healthy young Indian men in Madras gave a mean haemoglobin value of 16.57 gm. per 100 cc blood. The mean level for the soldiers three days after arrival in the hills was however lower than this being only 12.84 gm per 100 cc. blood. After one week it had risen to 17.46 gm. and after three weeks to 19.56 gm. At the end of the fifth week the value was 20.38 gm. and a month later at the final examination it was 19.65 gm. The figure for 125 soldiers already resident at 6 000 ft for two years was found to be 20.38 gm per 100 cc. blood so that it appeared that a rapid increase occurred during the first week and that the maximum was reached within four to six weeks.

FITZGERALD concluded that for every 100 mm fall in the barometric pressure there is a haemoglobin increase of 10 per cent. above the amount present at sea-level which would imply an increase of 15 per cent at Wellington over Madras. Actually the increase in the soldiers



was in the neighbourhood of 50 per cent but it is possible that the values recorded on arrival from Madras were abnormally low in view of the figures for Indians in Madras. Nevertheless the investigation supports the common conviction that it is wise to take things easily during the first few weeks of residence in a hill station.

F Murgatroyd

**FÄLGERMAY (Poul)** The Normal Values for Hemoglobin, Erythrocytes and Cell Volume per cent, and the Corpuscular Constants derived thereof in Children aged 8-14 Years. Examinations of 300 School-Children in Stockholm.—*Acta Med. Scandinavica* 1938 Vol. 95 No. 6. pp 566-596 [22 refs.]

Although a number of publications deal with the normal blood findings in infancy and particularly in the first year of life the remaining period of childhood has been less vigorously studied, and what records there are present considerable disagreement. After summarizing the results of previous workers, the author records his own observations in Stockholm on 300 children aged 8-14 years. They were apparently normal and healthy but by more refined anamnesis and examination a secondary sub-group was selected for comparison. There was approximate agreement between the two groups. The children were also divided into age groups and sexes. Heparinized finger blood was used and haemoglobin value (Hellige) erythrocyte counts and cell volume (haematocrit) were determined, the results being submitted to thorough statistical analysis. For the whole group the following mean values were obtained: haemoglobin 13.432 gm. per cent, erythrocytes 4.731 millions per cmm. and cell volume 40.78 per cent. Detailed tables showing the individual records and summarizing the values for the various groups are given.

F Murgatroyd

**WAUGH (Theodore) & ASHERMAN (Edward G.)** The Use of an Index of Hemolysis in expressing the Fragility of Erythrocytes.—*Jl Lab & Clin Med* 1938 Apr Vol. 23 No. 7 pp. 746-751. With 3 figs.

Previously by adding 5 cmm blood to each of ten tubes containing 1 cc. salt solution in increasing dilutions the fragility of the erythrocytes was determined roughly by macroscopic observation or more precisely by counting the number of unhaemolysed cells in aliquot portions of the various tubes. The authors found the enumeration of the cells somewhat laborious and they have now altered the technique so that the haemoglobin liberated by the haemolysis can be directly determined by means of the Eichel photo-electric colorimeter. The method was found to be rapid and precise.

F Murgatroyd

**HUMPERDINCK (C.)** Vergleichende Hämoglobinbestimmungen mit dem Bürkeraschen Hämoglobinomometer dem Hämometer von Zells-Ikon und Hämometer nach Hellige. (Comparative Haemoglobin Determinations with the Haemoglobinomometers of Bürker Zells-Ikon and Hellige).—*Arch f. Gewerbepath u. Gewerbehyg* 1937 Dec. 24 Vol. 8 No. 3 pp. 321-323.

In the Zells-Ikon haemoglobinomometer the blood dilution is constant a number of readings can be made and the average obtained, and the

comparison of the hydrochloric acid solution with the colour scale is easy as the colour fields are only separated by a fine line

Tables are given showing a number of comparative observations made with the large Bürker's haemoglobinometer and with the haemoglobinometers of Zeiss Ikon and Hellige. Blood was obtained from the lobe of the ear with the usual precautions a free flow being obtained and the first drop rejected

In the large Bürker's haemoglobinometer the blood is diluted 100 times reduced with sodium hyposulphite and compared spectroscopically in a comparative optical system with a durable standard reduced haemoglobin solution. For accurate work the colorimetric comparison in the Bürker apparatus is the most reliable.

The tables show close agreement between the values obtained in the Bürker and the Zeiss-Ikon methods but those obtained with the Bürker and the Hellige apparatus differed considerably

From his experiments the author considers the Zeiss-Ikon instrument very useful on account of its handiness and reliability

*F Murgatroyd*

LEE (Terence) The Sedimentometer A Photographic Recorder of the Suspension Stability of the Erythrocyte.—*Amer Jl Med Sci* 1938 June Vol. 195 No 6 pp 729-733 With 5 figs. (2 on 1 plate) [13 refs.]

In examining the sedimentation of blood a series of readings at short intervals gives considerably more information than a single reading after some arbitrary period. In order to obviate the obvious inconvenience of taking frequent observations the author has devised his sedimentometer\*. In this instrument light from any reasonable source including daylight having passed through a frosted glass window falls on a slot holding the sedimentation tube where it is transmitted through the plasma but absorbed by the cells. The transmitted light then passes through a lens which focuses an image of the tube on a light sensitive paper behind a narrow vertical slit at the back of the apparatus. The paper is mounted on a simple stage driven across the slit by clockwork so that a continuous record is obtained. A suitably marked transparent film in front of the paper is used to record the time intervals and the degree of sedimentation. For compactness short tubes are used but the speed of the stage and the magnification of the lens are adjustable to give graphs directly comparable with standard curves for varying tube lengths.

*F Murgatroyd*

CUTLER (J W) PARK (F R.) & HERR (B S) The Influence of Anemia on Blood Sedimentation.—*Amer Jl Med Sci* 1938 June Vol 195 No. 6 pp 734-751 With 13 figs [19 refs]

Cells of slowly sedimenting blood transferred to plasma of rapidly settling blood settle rapidly whereas cells of rapidly sedimenting

\* The instrument is manufactured by the Ellis Optical Company U.S.A., and is distributed in England by Messrs. Hawksley & Sons Limited, London.  
(1971)

blood suspended in plasma of slowly sedimenting blood settle slowly. These facts are found to be directly correlated with the percentage of cells forming rouleaux and the number of cells in rouleaux under the various conditions of the experiments. A similar correlation was found in further experiments. When the plasma of rapidly settling blood was diluted with physiological saline solution the sedimentation rate was progressively slowed and became almost inhibited when a dilution of one part of plasma in four parts of saline was reached. Cells from this final mixture re-suspended in original plasma again sedimented quickly. The addition of lecithin sodium oleate bile salts or formaldehyde to rapidly settling blood inhibited sedimentation, but cells from blood so treated, when washed and re-suspended in original plasma again settled rapidly. On the other hand, the addition of acacia, agar, casein or gelatin to slowly settling blood increased the sedimentation rate and washed cells from blood so treated re-suspended in the original plasma regained their slow sedimentation rate. Defibrination of the plasma produced but little change in either sedimentation rate or rouleaux formation. In all these and further experiments the sedimentation rate was found to be directly proportional to the formation of rouleaux. The ability of the cells to form aggregates is a function of the plasma and is specific for that plasma. The specificity is little influenced either by the size although size may be a factor in making up the mass of the aggregates by the shape or by the number of cells in suspension. Once aggregates form they settle at a speed more or less in accordance with Stokes's law of hydrodynamics; the greater the mass of the aggregates the more rapid is sedimentation and *vice versa*.

In the graphs of the more rapid sedimentation three phases can be differentiated. The first is a slow phase during which the cells are forming aggregates; the second more rapid phase represents the sedimentation of these aggregates and the third phase again slow represents the final packing of the cells. It is only this third phase that is materially influenced by anaemia itself in that the fewer the cells, the less volume they occupy. Consequently sedimentation rates based upon a single observation at the end of some arbitrary period reflect not only sedimentation velocity but also cell volume and are therefore influenced by the degree of anaemia.

This leads to erroneous conclusions since anaemia itself has little to do with the phenomenon of sedimentation proper. Rapid settling is the result of the cells forming large aggregates or rouleaux and if no aggregation takes place sedimentation is slow no matter how marked the anaemia. Corrections for anaemia based upon readings after removal of plasma cannot give consistent results since sedimentation becomes slow in proportion to the amount of plasma removed. When a large quantity of plasma is removed normal rates may be recorded which do not check at all with the clinical state of the patient. This is wrongly referred to in the literature as "over-correction" it is not correction but interference with the mechanism of rouleaux formation to a point where the sedimentation phenomenon practically disappears. When multiple readings are employed the nature of the graph isolates the anaemia factor (packing phase) from blood sedimentation (aggregation and sedimentation phases). The shape of the curve portrays the disease; the index reflects anaemia as well.

SUZUKI (Tamotsu) & SATO (Shun) A Case with a Remarkable Prolongation of Blood Coagulation Pseudohemophilia Hepatica (Frank) The First Case published under this Name in Japan, in spite of Possibly Frequent Occurrence in the Newborn Age—*Tohoku Ji Experim Med* 1938. July 18 Vol. 33 No 5 pp 398-407 With 1 fig

A male baby 36 days old presented a severe haemorrhagic diathesis with remarkable prolongation of coagulation time. Jaundice had occurred four days after birth and again about a month later just before the haemorrhagic tendency became apparent. The spleen was not enlarged and Murata's reaction for syphilis was negative. The authors believed they could exclude haemophilia, congenital haemolytic anaemia, purpura haemorrhagica, fibropenia, scurvy and any exogenous toxic cause.

They suggest that the jaundice indicated a disordered liver function and that the case was an example of pseudohaemophilia hepatica. blood coagulation was restored to normal before the jaundice faded completely and the authors state that the prolonged coagulation was probably not due to the presence of jaundice [what was the bile content of the stool is not clear however]. They believe recovery was due to the administration of Yakriton, the detoxicating hormone of the liver [but they also employed oryzamin and blood transfusions].

F Murgatroyd

PELLICCIOTTA (Raffaele) Contributo alla conoscenza dell'anemia tropicale [On Tropical Anaemia].—*Arch Ital Sci Med Colon e Parassit* 1938 May Vol. 19 No 5 pp 257-310 [20 refs]

In continuation of his recently reported work [see above] the author records that he has seen 43 further cases of the syndrome of anaemia in Italian immigrants into Abyssinia. He divides these into two groups: those who were followed up until cure was complete, and those in whom, for various reasons, the follow up was impossible or the cure uncertain. He describes the 30 cases in the first group in detail.

The general conclusions are the same as in the previous paper and the author emphasizes the syndrome of temporary hyperchromic anaemia with debility and nervous symptoms curable without medical treatment and independent of any infection, dietary deficiency or defective hygienic surroundings. It is a specific tropical anaemia occurring in Europeans recently arrived in a tropical country.

C W

TROWELL (H. C.) A Case of Tropical Macrocytic Anaemia.—*East African Med J* 1938 June. Vol. 15 No 3 pp 69-73

Hyperchromic anaemia responding to marmite and not to iron, in a young male Ruanda native without achlorhydria and without increased bilirubinaemia is described. The patient had undergone a period of semi-starvation and the author suggests that the case is one of tropical macrocytic anaemia of nutritional origin.

F Murgatroyd

WILLS (Lucy) & EVANS (Barbara D F) Tropical Macrocytic Anaemia  
Its Relation to Pernicious Anaemia.—*Lancet* 1933. Aug 20  
pp 416-421

The experimental deficiency anaemia of monkeys which is supposed to be the animal counterpart of human tropical macrocytic anaemia, responds to crude liver extracts but not to highly purified extracts even in enormous doses. In view of this surprising result the effect of the purified extracts was examined on the human disease.

With anahaemin, although the doses were relatively very high there was no clinical improvement, no reticulocyte crisis and no appreciable rise in the red cell count. With examen the therapeutic response also appeared disappointing. Fractions made from campolon by extraction with saturated ammonium sulphate did not give clear cut results but the evidence suggested that in some instances there was a very considerable loss of potency in the insoluble fraction.

It is clear then that tropical macrocytic anaemia does not respond to the more highly purified liver extracts which contain the liver principle curative in pernicious anaemia in relatively pure form. This further differentiates the two diseases and suggests that like the nutritional anaemia of monkeys human tropical macrocytic anaemia is due to a deficiency in the diet of some factor other than Castle's extrinsic factor. The new factor which does not appear to be vitamin B<sub>12</sub>, B<sub>6</sub>, la toflavin or nicotinic acid, is present in crude liver and in autolyzed yeast extracts. At present therefore all cases of tropical macrocytic anaemia and the macrocytic anaemia of spruce, should be treated with the cruder liver extracts or marmite. When expense is a consideration a few cc of some preparation such as campolon, supplemented by the daily administration of 30 to 60 gm. marmite will in most cases induce a rapid remission and marmite alone will often be sufficient.

F Murgatroyd

NAPIER (L. Everett) DAS GUPTA (C. R.) CHAUDHURI (R. N.) SEN (G. N.) RAI CHAUDHURI (M. N.) SEN GUPTA (P. C.) & MAJUMDER (D. N.) Anahaemin in Tropical Macrocytic Anaemia.—*Indian Med. Gaz.* 1933. July Vol. 73. No 7 pp 385-390 With 8 charts.

This paper records experiments undertaken to confirm Dr Lucy Wills's suggestion that highly refined anahaemin would probably prove inactive in certain types of macrocytic anaemia as it had done in the macrocytic anaemia of monkeys.

Six cases of macrocytic anaemia in pregnant women were treated with anahaemin. Three cases must be disregarded since one patient died six days after treatment commenced, another showed a reticulocytosis before treatment started and a third was accidentally also given campolon. Of the remaining three one showed a reticulocytosis of 21 per cent and an increase of 1 million red cells per cmm six days after 200 mgm. of anahaemin. The other two showed only a slight increase in red cells after treatment with anahaemin although one subsequently responded well to neobepate.

Three cases of macrocytic anaemia in males failed to respond to anahaemin, but of these patients one had kala azar, another a haemolytic anaemia which equally resisted campolon and iron while the third was an aplastic anaemia, possibly due to sulphamylamide. A fourth case which had failed to respond to marmite gave a slight response after anahaemin and is of interest in that within a fortnight

the macrocytic orthochromic anaemia became a microcytic hypochromic anaemia which on the administration of iron rapidly became normal. Two other cases showed an immediate and marked improvement after anahæmin. Three other cases which subsequently responded to campolon failed to respond to heparinova, but one of these was equally unresponsive to heparinova, ventriculin and a well known proprietary liver extract.

Discussing the results the authors point out that marmite which contains extrinsic factor and ordinary liver extract which contains both extrinsic and intrinsic factors highly refined liver extract which is supposed to contain hæmatopoietin the combined extrinsic and intrinsic factors and is so potent in pernicious anaemia produces no response in some cases of tropical macrocytic anaemia which anahæmin is said to cure. The authors suggest that tropical macrocytic anaemia is not a single entity and includes (a) a group in which anahæmin is curative i.e. in which the deficiency is the same as in pernicious anaemia (b) a group in which marmite or crude liver extract is curative i.e. in which the marmite principle is deficient and (c) a possible third group in which campolon is curative but other liver extracts are not i.e. in which some principle peculiar to campolon is deficient.

SAI (Gen-Itiro) Ueber Wirkungen der Bluttransfusion mit Kupfer-Ion auf akute Anämie bei Frauen. [Infections of Copper in Puerperal Anaemia. — *Tohoku J. Experim. Med.* 1938. July 18 Vol. 33 No. 5 pp. 369-378. F. Murgatroyd]

In view of the therapeutic effect on anaemia of copper by the mouth and the results of injections of copper in experimental anaemia of rabbits the author treated a number of women suffering from loss of blood following childbirth by injections of copper a 0.1 per cent. solution of purified copper sulphate in 3 S per cent. sodium citrate was prepared and 0.08-0.1 mgm. copper per kgm. body weight was given.

For comparison the patients were divided into four groups whose average blood loss was from 19.6 to 29.83 per cent. Those in the first group were allowed to recover spontaneously and two to three weeks later the blood values still failed to reach their original levels. The patients of the second group were treated by simple blood transfusions of on an average 100-200 cc. blood and in the majority of cases blood regeneration was again incomplete at the end of two weeks. Patients of the third group were treated by blood transfusions with the addition of the copper solution and their erythrocyte counts were for the most part normal within a fortnight. Patients of the fourth group were only given intravenous injections of copper in saline solution but even this treatment appeared more effective than copper free blood transfusions. No secondary effects of dosage with copper were observed.

SAI (Gen-Itiro) Ueber Wirkungen der Bluttransfusion mit Kupfer-Ion auf chronische Anämie bei Frauen. [Copper in the Treatment of Chronic Anaemia in Women.] — *Tohoku J. Experim. Med.* 1938. July 18 Vol. 33 No. 5 pp. 379-382. F. Murgatroyd]

Following his work on the treatment of acute anaemia with copper (see above) the author treated 16 cases of chronic anaemia, mostly in

patients suffering from carcinoma of the uterus by blood transfusion with the addition of copper as control, eight similar cases were treated by simple blood transfusion. The blood transfusions with copper were much more effective than the simple transfusions. After simple blood transfusion the improvement in the red cell count was only slight, the average increase two weeks later being 275,000 per cmm. whereas after blood transfusion with the addition of copper the average increase was 876,000 per cmm. Moreover in the same period the average increase in haemoglobin was only 5 per cent. after simple transfusion but reached the striking figure of 12 per cent. after transfusion with the addition of copper. Study of the blood pictures suggested that simple transfusion temporarily suspended the haematopoietic activity which set in again after a few days but for the most part returned to its original value in a fortnight. against this, blood transfusion with the addition of copper increased the haematopoietic activity immediately and at the end of two weeks the effect was still apparent.

It is suggested that in the mobilization of red cell reserves as well as in a depressant influence on haemolytic activity copper strengthens the favourable effects of blood transfusion. *F Murgatroyd*

MUNDAY (Betty) SHEPHERD (Marion L.) EMERSON (Louise) HAMIL (Brenton M.) POOLE (Marsh W.) MACY (Ida G.) & RAIFORD (T. E.)  
 Hemoglobin Differences in Healthy White and Negro Infants.—  
*Amer Jl Dis Children* 1938 Apr Vol 55 No 4 pp 776-783 With 2 figs

Comparison of the haemoglobin values of 335 white and of 140 negro babies showed no significant racial difference during the first three months of life. During the remainder of the first year however the average values for the white infants were from 0.5 to 1 gm haemoglobin per 100 cc blood higher than those for the negro infants, and during this period values for the negro infants were characterized by significantly greater variation than those for the white infants. Despite the differences in haemoglobin, the study failed to establish any significant racial difference between the red cell counts of white infants and those of negro infants.

Dietary changes could not have been responsible for the haemoglobin differences observed and all the subjects were average healthy infants whose nursing was carefully supervised. *F Murgatroyd*

SIMICI (D.) & MONTAUDO (V.) Recherches sur l'action hématopoïétique de l'urine dans le traitement des anémies. [Haematopoietic Action of Urine in the Treatment of Anaemia].—*Bull Acad Méd Roumanie* 1938 3rd Year Vol 5 No 3. pp. 367-372. With 1 chart

On the theory that the kidneys possess the property of elaborating haematopoietic substances which are excreted in the urine and which are comparable with those elaborated by the liver and stomach the authors administered by rectal drip twice daily 300 gm of fresh urine from a healthy infant to seven cases of anaemia. During 14 to 30 days of treatment there were increases in the erythrocyte counts and, with two exceptions, in the haemoglobin values, while daily reticulocyte counts showed typical curves of blood regeneration.

Whether the hypothetical haematopoietic substances are elaborated or being performed, are merely excreted by the kidneys the authors are uncertain but they believe that these results show that such substances exist in the urine. No records of any control observations are given and in view of the authors' premise it is not without significance to observe that five of the cases were secondary hypochromic anaemias.

F Murgatroyd

ENGELBRETH HOLM (J) & SMITH (C C Winkel). A Source of Error in the White Blood Count.—*Acta Med Scandinavica* 1938 Vol. 95 No 2-4 pp 129-135 With 2 figs

When heparinized or citrated blood is left standing the leucocytes and platelets decrease and finally disappear as a result of autolysis. Similarly blood diluted with Türk's solution for leucocyte count may also change on standing the leucocytes in some samples decreasing markedly (as much as 20 per cent) within a few hours. Incidentally, on the other hand the peculiar fact was noted that blood from some persons showed no fall in leucocytes. Preservation of the samples at low temperatures failed to inhibit the falls significantly but the addition of 5 to 10 per cent. formalin did, although even with formalin a fall of 10 per cent. may occur during the first few hours.

Since the fall was thought to be due to autolysis by proteolytic enzymes of the leucocytes themselves the addition of 1 per cent. sodium fluoride to the Türk's solution was tried in an endeavour to destroy such enzymes. A difficulty with this solution however was that it failed to haemolyse the red cells. Finally a saponin fluoride solution (saponin 0.2 gm. methyl violet 0.1 gm. sodium fluoride 2.0 gm. distilled water 200.0 gm.) was used for diluting the blood. The decrease in the leucocyte count with this fluid did not exceed 1 per cent. in 24 hours. A fine precipitate may appear in the counting chamber but it does not impede the counting. The solution should be preserved in a paraffin-lined bottle or be made freshly every few weeks as fluoride loss occurs in contact with glass. If the count can be made immediately after the blood is taken, standard methods are of course adequate for routine procedures.

F Murgatroyd

SCHRETZENMAYR (A.) Die Sternalpunktion in der Tropenmedizin. [Sternal Puncture in Tropical Medicine]—*Arch. f. Schiffs u. Trop. Hyg.* 1938 Apr Vol. 42 No 4 pp 149-161 With 3 figs. [14 refs]

The author examined the bone marrow obtained by sternal puncture in a number of tropical conditions.

Generally in malarial anaemias the marrow shows a normoblastic reaction but sometimes in chronic malarial anaemia, with much enlargement of the spleen, the marrow changes resemble those of pernicious anaemia with a megaloblastic response. Frequently these cases have other characteristics of pernicious anaemia, e.g. a colour index of one or more and they respond usually well to liver therapy. [It would be interesting to know whether this type of anaemia is in fact due to uncomplicated malarial infection or whether other factors such as dietetic deficiencies play any part.]

In blackwater fever the marrow shows soon after the attack a marked normoblastic reaction.



In anaemias associated with ankylostome infections the primary reaction of the bone marrow is regenerative but in severe ankylostome anaemia the appearances are those of an aplastic marrow and in the author's opinion the picture suggests a toxic cause.

In the diagnosis of suspected cases of malaria with negative blood findings thick-drop preparations of bone marrow treated in the same way as thick-drop preparations of blood, may according to the author yield positive results and the method is free from the dangers and difficulties of spleen or liver punctures.

The author states that intramuscular injection into the same or other patient of marrow removed by sternal puncture is useful for treatment. The injection immediately produced a long continued increase of the reticulocytes of the blood which, in his opinion suggests a strong stimulus of the bone marrow. The hard large spleens of malaria, which frequently resist every therapy after one or more injections of bone marrow become smaller. [Such resistant spleens must surely be fibrotic and it seems difficult to imagine the mechanism of action of one cc. of bone marrow pulp in such cases: the author rightly questions whether the results are *post hoc* or *propter hoc*.]

F Murgatroyd

PARKEH (J. G.) Familial Eosinophilia (with a Case Record).—*Med Bull Bombay* 1938 June 4 Vol. 6, No. 11 pp 371-375  
With 1 chart

Chance examination of a young man gave the following blood findings: red cells, 5,060,000 per cmm; haemoglobin 97 per cent; white cells 42,000 per cmm. The differential white count is recorded as polymorphs 5, lymphocytes monocytes 13.5, eosinophiles 81, premature cells 0.5 per cent. The eosinophil percentages in other members of the family were: father 8, elder brother 2, younger brother 26, and patient's brother 81. [Thus the text, neither chart nor table, however shows a patient's brother with 81 per cent and presumably this is the patient himself.] No member of the family ate pork, presumably excluding trichinosis, no member had any history of skin disease, parasitic infection [the stools were not examined] or allergic manifestations, but the patient said that he developed a generalized purpuric rash whenever he took quinine. Enlargement of the spleen, anaemia and general symptoms of leukaemia were absent. The investigations terminated with the untimely death of the patient, possibly from septicaemia following a fish bone injury but the author believes he represented a case of familial eosinophilia.

F Murgatroyd

SHIRAIISHI (Shingo) & SHINDO (Masayuki). Preliminary Report on Blood Picture of Infantile Preberiberi (Sato) in Comparison with that of Infantile Beriberi and Infantile B-vitaminotic Dyspepsia (Sato).—*Tohoku Ji Experim. Med.* 1938, Mar 15 Vol. 32 Nos. 5 & 6, pp 470-483. [25 refs.]

There were no essential differences between the blood pictures of 15 cases suspected of infantile pre-beriberi—infants who had been fed with human milk negative to Arakawa's reaction but who presented

negligible symptoms of disease—and those of 5 cases of infantile beriberi and 3 of B-avitaminotic dyspepsia

In general the red cell count was normal. Of the white cells the neutrophils tended to show a decrease the lymphocytes an increase with occasional decrease in some pre-beriberi cases the basophils were normal, while the eosinophils and monocytes were variable. An outstanding feature of all cases was the high degree of thrombocytosis. The peroxidase staining time for the neutrophils was increased.

*F Murgatroyd*

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#### ERRATUM.

Vol. 35 No. 2 p. 132 in the summary of Dr. D. O. SHIEL's paper on a Comparison of Punctate Basophilia and Ratio of Large to Small Lymphocytes in the Diagnosis and Prevention of Lead Poisoning it was stated that lead poisoning with disability might be expected where the concentration of lead in the urine equals or exceeds 1.5 mg per litre. For "1.5 mg per litre" read "0.15 mg per litre".

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## REVIEWS AND NOTICES.

ROGERS (Leonard) [KCSI LL.D. MD FRCP FRCS FRS  
Hon. Treasurer Research Defence Society.] *The Truth about  
Vivisection*—pp x+182 With 9 illustrations. 1937 London  
J & A. Churchill Ltd 104 Gloucester Place, Portman Square.  
[5s.] [Review appears also in *Bulletin of Hygiene*]

In his evidence before the Royal Commission on Vivisection of 1906-08 Lord Justice Fletcher Moulton, FRS pointed out that the opponents of medical veterinary and scientific research involving experiments on animals saw only the pain which might be caused to individual animals without thought of the suffering which might be alleviated in countless animals and mankind as a result of knowledge gained by the scientific approach to problems of disease and death by the experimental method. He held that it is our duty "to take that line which produces the minimum total pain" and stated that whether the pain is inflicted pain or whether it is preventable pain which is not prevented, was in his opinion one and the same thing.

Sir Leonard Rogers, Honorary Treasurer of the Research Defence Society, in his admirable little book entitled *The Truth About Vivisection* has borne this ethical principle in mind and has examined the controversial question of vivisection in respect of the evidence for inflicted pain and cruelty and the evidence that experiments on animals have resulted in the alleviation of suffering to animals and man. Innumerable books, pamphlets and reports have been published on the subject of vivisection but Sir Leonard has brought within the compass of a pocket edition all the main arguments for and against the continued use of animals for research under the Act 39 and 40 Vict. Cap. 77 of 1876 which regulates, controls and permits the use of animals in experimental research in the United Kingdom.

At the commencement of his book Sir Leonard discusses the meaning of the term vivisection which is a word calculated to produce a sense of horror in the minds of those who do not realize how loosely it is applied to animal experiments whether they involve an actual cutting operation or not. He points out that the word vivisection was used long before the discovery of anaesthetics and consequently it meant "painful cutting operations upon un-anaesthetised animals." The Act of 1876 which followed the Royal Commission on Vivisection of 1875 enforced the use of anaesthetics of such a power as to prevent the animal feeling pain in surgical operations and in the final report of the second Royal Commission on Vivisection published in 1912 it is recorded that the Chief Inspector of the Home Office, under the Act of 1876 stated that "Vivisection of an animal, in the proper sense of the term, without anaesthetics, has not in any case been allowed by the Secretary of State."

To-day although the term vivisection does not appear in the Act of 1876 it is used indiscriminately by the opponents of research for every type of experiment carried out under the Act in registered laboratories by licensed research workers, whether their research involves feeding experiments, inoculations, or the external application of medicaments and the routine work necessary for the preparation and standardization of drugs and sera. The anti-vivisectionists continue to take full advantage of the word vivisection with its implication of cruelty and therefore Sir Leonard has divided his book

into two parts. The first part deals very fully indeed with the case of the opponents of vivisection particularly in respect of the evidence submitted by anti vivisection witnesses before the Royal Commission of 1906-08. He clearly expounds the terms and administration of the Act of 1876 under which the Home Secretary has power to permit the use of living animals for research and to safeguard such use from abuse. In dealing with the anti vivisection propaganda subsequent to the publication of the final report of the Royal Commission in 1912 Sir Leonard has drawn largely on the publications of the Research Defence Society and after pointing out that it is now a common practice for anti vivisectionists to attack veterinary institutions and hospitals where pathologists hold licences under the Act he rightly raises the question as to whether such organizations as anti vivisection societies can legitimately claim to be good charities.

The second part of the book deals with the case for the medical scientists and emphasis is laid on the important fact that both Royal Commissions on Vivisection (1875 and 1906-8) rejected every ground—ethical, humanitarian and utilitarian—on which the anti vivisectionists demanded legal prohibition of all scientific experiments for the advancement of medical and scientific knowledge. Both Commissions were appointed as a result of the agitation of the opponents of animal experiments and the fullest possible opportunity was given for the anti vivisectionists to establish their case. Sir Leonard then deals in some detail with the irrefutable evidence that the results of research have benefited man and animals. He points out how fully the belief expressed by the Royal Commission of 1875 that further research would lead to further mitigation of suffering had been realized by the time of the second Commission in 1906 and in an admirable summary of the outstanding achievements in medical and veterinary science and practice during recent years he covers a wide field. Among the subjects dealt with in this part of the book are the following: thyroid extract, adrenalin, insulin in relation to scurvy, rickets, caries of the teeth, beriberi, drugs in diabetes, liver hormones, local anaesthetics, analgesics, the salvarsan group including soporifics, fever, trypanamide and Bayer 204 in sleeping sickness, antimony in kala azar and bilharziasis, carbon tetrachloride in hookworm disease, plasmoquine and atebryn in malaria, and antiseptic and aseptic methods. In a chapter on the infective diseases of man, plague, cholera, diphtheria and yellow fever are referred to and finally infective diseases of animals such as anthrax, swine erysipelas, glanders, rinderpest, blackquarter, haemorrhagic septicaemia in cattle, hydrophobia and distemper in dogs and numerous other examples of the results of the application of knowledge gained by research are given.

In view of the strength of the case for research as presented by Sir Leonard, and in fact the urgent necessity for the active prosecution of the search for knowledge by means of the experimental method it would seem to many to be inconceivable that there should be opposition to such humanitarian endeavour. It must be remembered however that the average member of the public has but little opportunity of hearing from authoritative sources about research and advances in medicine and science which are common knowledge to professional men and women. This being the case the opponents of research which they call vivisection gain financial and moral support for

their societies through propaganda by shop window displays articles in the Press advertisement literature and canvassing and not infrequently in this and in other countries persuade ill-informed representatives of the people to try and secure the passing of legislation which would seriously hinder and, in some cases actually prevent the alleviation of human and animal suffering. It is therefore still an unfortunate necessity to take effective steps to prevent anti vivisectionists however well-meaning they may be from gaining support and achieving their objective. In order to do this Sir Leonard in the conclusion to his book earnestly appeals for the education of the public in the truth about vivisection which the very word itself tends to obscure.

By devoting his time and energy to the preparation of this readable and valuable booklet which he has fittingly dedicated to Stephen Paget the Founder of the Research Defence Society Sir Leonard has himself taken a much needed step towards achieving a wider and better understanding of this controversial subject and in so doing he has performed a service to medical and scientific progress.

G P Crowden

BLACKLOCK (D B) M.D. (Edin.) D.P.H. (London) D.T.M. (Liver) etc. & SOUTHWELL (T) D.Sc. Ph.D. A.R.C.Sc., F.Z.S. F.R.S.E., etc.<sup>1</sup> *A Guide to Human Parasitology for Medical Practitioners.* Third Edition—pp viii + 259. With 2 coloured plates and 122 text figs. 1938. London H. K. Lewis & Co. Ltd. [12s. 6d.]

The first and second editions (1931 and 1935) of this excellent little book have received full notice in this *Bulletin* (Vol. 29 p. 165 and Vol. 33 p. 160). It is pleasant to find that although the editions increase the size and price do not do so. The third edition is exactly the same size as the second, and in almost all respects is unchanged. The chapter on malaria has however been re-arranged on a plan which the authors hope will facilitate the study of the subject by students and the section on leishmaniasis has been largely re-written in light of the most recent investigations on its transmission.

The reviewer has been unable to find anything which he can criticize with the single exception of the paragraph relating to the development of the pathogenic trypanosomes of man in *Glossina*. No reference is made to the peritrophic membrane and the important part which this structure plays in the developmental cycle of these trypanosomes in the tsetse.

W. Yorks

# TROPICAL DISEASES BULLETIN

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## TROPICAL OPHTHALMOLOGY

### A REVIEW OF RECENT ARTICLES XXX\*

*Conjunctiva—Trachoma*—Some scepticism regarding the specific nature of the various bodies found in the conjunctival epithelium of trachomatous patients is recorded by GRÖTER.<sup>1</sup> He has made a careful study of material obtained from the cornea of rabbits and human subjects and the action thereon of various irritants—varicella vaccine herpes staphylococcic toxin mustard oil, trachoma and bleborrhoeic conjunctivitis—and he has reached the conclusion that inflamed trachomatous epithelial cells cannot be shown to contain any granular structures of a nature differing from their own. His investigations disclosed no evidence to support the view that the various granular structures described in the literature were the initial structures of a hitherto invisible disease germ in the tissues. He considers the "trachoma rickettsias" described by BUSACA to be inflammatory proliferations and divisions of granula which normally occur in the epithelial cells. Evidence in favour of the specific nature is offered by JULIANELLE<sup>2</sup> who for the past six years has studied experimental trachoma in monkeys. Admittedly this experimental disease is a folliculosis of the conjunctiva unassociated with pannus or cicatrization, but it appears to be provoked solely by the inoculation of trachomatous material.

Assuming that this experimental disease is a true trachoma, the author's observations led him to conclude that the disease is an infection independent of associated factors such as constitution nutrition co-related infection etc. and that the infecting agent is a virus characterized by low infectivity occasional filterability marked tissue specialization ineffectual immunogenic properties slight propagative capacity sensitivity to physical and chemical agents and the accompaniment of inclusion bodies. This virus may be a rickettsia and the cause of the inclusion body or its component parts. TOULANT<sup>3</sup> considers that trachoma may exist in a latent form

For the 29th of this series, see Vol. 35 pp. 411-415

<sup>1</sup> GRÖTER (Wilhelm). The Microstructure of Epithelial Cells and its Importance for the Aetiology of Trachoma.—*Brit. Jl. Ophthalmol.* 1933. May Vol. 22. No. 5 pp. 300-303

<sup>2</sup> JULIANELLE (L. A.). Studies on the Pathogeny of Trachoma.—*Brit. Jl. Ophthalmol.* 1933. June. Vol. 22. No. 6 pp. 336-344 [30 refs.]

<sup>3</sup> TOULANT. Le trachome fruste.—*Rev. Internat. du Trachome* 1933. Apr. Vol. 15. No. 2. pp. 65-73 [21 refs.]

free from the development of conjunctival granulations and corneal scars cicatrization also is too indefinite to afford any aid in diagnosis. Symptoms may be very mild. The author deprecates any drastic method of treatment and indeed states that the disease may often undergo a spontaneous cure [It is extremely doubtful if the condition described bears any relation to trachoma. Attention to the state of the general health and the correction of any error of refraction are likely to prove the most suitable treatment.]

In discussing this paper MACCALLAN<sup>4</sup> remarked that follicles might be masked by the presence of a papillary hypertrophy or might be absent owing to a generalized lymphocytic infiltration without the aggregation of lymphocytes into follicles. If neither follicles nor a subepithelial infiltration were present the case was not one of trachoma. If either was present a vascular infiltration of the upper portion of the limbus developed soon after trachomatous infection. To justify the recognition of the condition described the subject must infect with undoubted trachoma an absolutely non-trachomatous patient in a totally non-trachomatous environment. The incidence of trachoma in the countries of the world other than Dominions, Colonies and Mandated Territories of Great Britain has been reviewed by MACCALLAN<sup>5</sup> in an article of considerable interest. A curious feature of the epidemiology is the manner in which some small communities as in Mecca preserve comparative immunity though situated in the midst of heavily infected populations. As one would expect the disease is most prevalent in those countries where bad hygienic conditions exist especially when such are associated with dusty winds and a high climatic temperature. In view of the possible rickettsial nature of the trachoma virus POLEFF and NAIK<sup>6</sup> have examined the serum of trachomatous patients in Morocco and have found Weil-Felix reaction positive in a high proportion of cases and regard this as evidence in support of the rickettsial origin of the disease. The clinical value of the test is not yet proved.

COMET<sup>7</sup> has examined over 4 000 scholars in Cambodia with a view to determining the influence there of adenoidism on trachoma. He found the incidence of naso-pharyngeal adenoid growths to be fifteen per cent. higher in trachomatous subjects than in the non trachomatous, but ten per cent. of the trachomatous were free from enlarged tonsils and adenoids. Naso-pharyngeal adenoids were very common in cases in which the diagnosis of trachoma was doubtful.

*Spring Catarrh*.—For the treatment of severe cases of this disease SEIDWITZ<sup>8</sup> advocates the complete removal of the tarsal conjunctiva.

<sup>4</sup> MACCALLAN (Discussion of TOULART paper above).—*Rev. Internat. du Trachome* 1933. July. Vol. 15. No. 3. pp. 109-111.

MACCALLAN (A. F.). The World-wide Distribution of Trachoma, excluding the Dominions, Colonies and Mandated Territories of Great Britain.—*Brit. Jl. Ophthalm.* 1933. Sept. Vol. 22. No. 9. pp. 513-541.

<sup>6</sup> POLEFF (L.) & NAIK (M.). La réaction de Weil-Felix dans le trachome et sa valeur théorique et clinique.—*Rev. Internat. du Trachome* 1933. July. Vol. 15. No. 3. pp. 113-129.

<sup>7</sup> COMET (Emmanuel). Enquête ophtalmologique et pharyngie des élèves des écoles de Pnom-Penh. Trachome et affections lymphadéniques du pharynx.—*Rev. Internat. du Trachome*. 1933. Apr. Vol. 15. No. 2. pp. 74-84.

<sup>8</sup> SEIDWITZ (N. I.). Anterior Conjunctival Fornix Operation in Severe Cases of Spring Catarrh.—*Brit. Jl. Ophthalm.*—1933. May. Vol. 22. No. 5. pp. 287-293. With 1 fig.

The operation resembles that for combined excision but the tarsal plate is left in position and the conjunctiva removed is limited to that portion of the membrane which covers the tarsus. It is necessary to excise the membrane right up to its conjunction with the skin at the lid margin in order to obviate the recurrence of papillae. The conjunctiva of the fornix is drawn down over the denuded tarsus and attached to the lid margin by three sutures placed respectively at the centre at the junction of the outer and middle third and at the junction of the inner and middle third. If the tarsus is found to be trachomatous it can be removed and a combined excision performed.

*Glaucoma* \*—Although primary non-congestive glaucoma is likely often to be caused by a general systemic disturbance *epidemic dropsy* is the only disease in which the association is hitherto known to be constant. KIRWAN and MUKERJEE have discussed the changes induced by the disease which are likely to lead to the development of a high intraocular pressure. The authors state that in epidemic dropsy a toxic agent is present in the plasma which produces a general dilatation of the capillaries and an increased permeability of their endothelial walls—this change is shared by the uveal capillaries and results in a marked increase of albumen in the aqueous humour whilst the globulins remain the same. The blood in epidemic dropsy contains a histamine-like base, which it is believed, brings about an increased permeability of capillaries as well as a dilatation. The difference between the osmotic pressure of the blood serum in the aqueous is considerably reduced by the presence of proteins in the aqueous and the concentration of chlorine ions diminishes in the aqueous and increases in the serum. The evidence supports the view that in epidemic dropsy glaucoma the filtration of fluid into the anterior chamber takes place by the process of dialysis as usual, but that the equilibria concerned are at a level different from that of normal subjects due probably to the altered permeability of the dialysing membrane.

*H Kirkpatrick*

\* KIRWAN (E. O'G.) & MUKERJEE (S. N.). The Osmotic Pressure of the Aqueous Humour in Epidemic Dropsy Glaucoma.—*Brit Jl Ophthalm.* 1938 June. Vol. 22. No. 6. pp 329-336 [12 refs.]

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## LEISHMANIASIS.

LAURINICH (A.) Dati statistico-clinici dal 1916 al 1936 raccolti nell'ambulatorio anti-kala azarico della R. Clinica Pediatrica di Napoli. [Kala Azar Statistics from the R. Clin. Pediatrics, Naples, 1916-1936.]—*Pediatrics* 1937 Nov 1 Vol. 45 No 11 pp. 957-966 With 7 graphs & tables

During the period 1916-1936 there have been treated at the clinic for pediatrics at Naples 844 cases of infantile kala azar. During the first ten years of this period there was an increase in the number of cases seen but subsequently the numbers diminished steadily. This rise and decline of the incidence appears to be due in the first place to a realization by the people of the good effects of treatment and secondly to the influence the treatment itself has had on the spread of the disease. The cases have been widely scattered, without any tendency for the disease to occur in epidemic form. In any individual focus, such as a village, the cases have often been limited to one or two streets. As regards the commencement of the disease, the first symptoms were most frequently observed in the months June to September with a concentration in the last named month. Judging by the age at which the first symptoms were noted the disease commenced most frequently in infants between a year and eighteen months old. Since the introduction of the tartar emetic treatment by DI CRISTINA and CANONIA there has been a steady improvement in the method of administration of this drug, so that the mortality rate amongst treated cases has fallen from 15 per cent to 0.35 per cent. The number of doses per case to effect a cure has varied from 84 to 8 with an average of 20 to 40. These have been administered twice a week. The experience at Naples has been that, though the organic antimony compounds offer certain advantages over tartar emetic, this drug is a more active remedy which it has not been found necessary to abandon.

C M Wenyon.

ANDERSON (Charles) Chronique du kala-azar en Tunisie [Chronicle of Kala Azar in Tunisia.]—*Arch. Inst. Pasteur de Tunis*. 1938. Mar Vol. 27 No 1 pp 96-104 With 1 map

The last paper in this series, which gives details of cases of kala azar observed in Tunisia appeared in 1934. The present paper extends the record to the end of 1937 with the description of a further eight cases bringing the total number of cases observed in the country since the discovery of the first by CATHOIRE in 1906 to 131. The distribution of the cases of kala azar and oriental sore is shown on a map while the incidence of the disease amongst the various nationalities according to age and sex is discussed.

C M W

BOISSERIE LACROIX TRAISSAC (Marcel) & DEPREUX Kala-Azar infantile [Infantile Kala Azar]—*Jl. Méd. de Bordeaux* 1938. May 7-14 Vol. 115 Nos. 19-20. pp 510-511

The case described is that of a child 30 months old who was found to have kala azar. Though the child was living at the time in the

suburbs of Bordeaux the disease was contracted in Nice. The diagnosis was made by spleen puncture after sternal puncture had failed to reveal leishmania. There was a good response to neostibosan treatment.

C M W

PÉHU & BERTOYE (P) Trois cas, non méditerranéens de kala azar infantile autochtones Vosges, Ardèche Isère. [Three Cases of Infantile Kala Azar outside the Mediterranean Region.]—*Bull Acad Méd* 1937 Nov 16 101st Year 3rd Ser Vol 118 No 34 pp 342-344

Cases of kala azar in both adults and children are commonly met with in the South of France on the Mediterranean littoral which is to be regarded as an endemic centre of the disease. Cases encountered in other parts of France generally give a history of residence in the endemic zone. In this paper the authors mention three cases in children in which there had never been residence in the south of France. One of these cases came from the district of the Vosges one from the mountainous Ardèche region and the third from Vinay near Grenoble

C M W

KIRMLIDIS (D) Beobachtungen ueber infantile Kala Azar in der Provinz Argolis (Peloponnes Griechenland) [Infantile Kala Azar in the Province of Argolis, Greece]—*Muench Med Woch* 1938 July 29 Vol. 85 No 30 pp 1143-1146 With 3 figs. [20 refs.]

During a three years residence in the Province of Argolis in the Peloponnesus, Greece the author encountered over 200 cases of infantile kala azar of which he was responsible for the treatment of 80. The disease is widespread in the eastern half of the province where it is well known to the people who recognize it on account of its main symptoms of fever anaemia enlargement of the spleen and petechiae, the local name for which suggests flea bites which they resemble. Though malaria is endemic in the same area cases of double infection are rare. In one case a diagnosis of a mixed infection was made by the discovery in material from spleen puncture of both leishmania and the parasite of benign tertian malaria. The disease in its clinical features complications and response to treatment with neostibosan resembles infantile kala azar as it occurs in other endemic areas. It is noted that in one particular group of villages there were so many cases that the disease could be regarded as having assumed an epidemic form hardly a single household having escaped the infection

C M W

RUDNEV (G P) Leishmaniose viscérale en Daghestan. [Visceral Leishmaniasis in Daghestan.]—*Med Parasit & Parasitic Dis* Moscow 1938 Vol. 7 No. 2. [In Russian pp. 234-235]

This is the first record of a case of visceral leishmaniasis in a native of Daghestan [roughly between 41° and 43°N along the east coast of the Caucasus]. It was diagnosed by a positive Ray's reaction (with negative controls) by Frey's adrenalin test and by the finding of isolated parasites enclosed in monocytes on the examination of thin and thick blood films though smears from spleen puncture failed to reveal any Leishman Donovan bodies.

C A Hoare

SHORTT (H. E.) & SWAMINATH (C. S.) The Viability of *Leishmania donovani* excreted in the Nasal Mucus in Indian Kala Azar—*Indian J. Med. Res.* 1937 Oct. Vol. 25 No. 2 pp. 341-343

In a previous paper the authors have recorded the finding of *Leishmania donovani* in the nasal mucus from cases of Indian kala azar. In the present paper they report the finding of parasites in the nose mucus of six of fifteen further cases examined. A hamster was infected by the intraperitoneal injection of the nasal mucus from one of the cases, which was in a man who became ill a year after coming to Coimbatore from Malabar. In neither of these districts has kala azar been previously reported. C M W

ADLER (S.) Factors determining the Behaviour of *Leishmania* sp. in Sandflies.—*Harefuah*. Jerusalem. 1933 Jan-Feb Vol. 14 No. 1-2 [In Hebrew pp 4-8. English summary pp I-II.]

The author has compared a Cretan with a Palestinian strain of *Leishmania tropica* as regards its power to develop in *Phlebotomus papatasi* in the presence of varying quantities of inactivated rabbit serum. In the case of the Cretan strain, which is normally transmitted by *P. sergenti* infection of the sandfly *P. papatasi* occurs with difficulty if the flagellate emulsion ingested is made up with 50 per cent. serum. On the other hand with only 10 per cent serum present infection of the sandfly readily takes place. With the Palestinian strain, of which *P. papatasi* is the natural transmitter infection occurs readily without regard to the serum concentration of the emulsion. It is suggested that in the case of *P. sergenti* the flagellates may be destroyed by the products of digestion of serum or that the sandfly produces antibodies injurious to the flagellates in the presence of concentrated serum. C M W

SOUTHWELL (T) & HIRSHKOPF (A.) On the Transmission of *Leishmania*.—*Ann Trop Med & Parasit* 1933. Apr 28. Vol. 32. No 1 pp 85-102 [30 refs.]

The authors discuss the mechanism of transmission of kala azar by sandflies and maintain that proof has not yet been obtained that the flagellate forms of *Leishmania donovani* whether from the culture tube or from the gut of the insect, are infective to hamsters or other experimental animals. It has been frequently shown that these cultural forms from the culture tube and from the fly are infective by a number of different routes of inoculation but it has not been possible to exclude in these experiments leishmania forms which are always present. The authors think that it is rather the leishmania form of the parasite which gives rise to infections than the flagellate stage just as it is the leishmania form which infects when inoculations are made directly from animal to animal. Accordingly it is their view that the transmission of kala azar by sandflies is the result of leishmania forms of the parasite deposited on the skin when an infected insect is crushed there. In support of this view which is not entirely original, reference is made to the numerous unsuccessful attempts

carried out to transmit by the bite of the sandfly. [The fact that a small number of successful transmissions by the bite of the sandfly have been effected in India seems to have escaped the authors' notice. Furthermore mention is not made of the fact that if infected sandflies are allowed to feed through a membrane on a fluid flagellate forms of leishmania not infrequently escape from the proboscis into the fluid and what is important from the authors' point of view that the fluid thus contaminated by the bite is infective though all observations have failed to indicate the presence of leishmania forms in the fluid or in the probosces of infected flies. It is true that *L. donovani* during its development in the sandfly shows a greater tendency to spread forwards to the proboscis in the case of *P. perniciosus* in the Mediterranean region than in the case of *P. argenteipes* in India and that this has led ADLER and THEODOR [this *Bulletin* 1931 Vol. 28 p. 639] to suggest that the disease in India which occurs usually in adults is caused by crushing while in the Mediterranean region, where infants and dogs are most commonly infected it is the bite which is responsible. It is claimed that infants and dogs are incapable of crushing sandflies on the skin but it has to be remembered that in India infants are by no means immune while in the Mediterranean region cases in adults are quite frequently met with. It is in India however that the infection has been successfully transmitted to hamsters by the bite and there is no reason to suppose that a similar result could not be obtained with *P. perniciosus* in the Mediterranean region. Whether the bite alone is responsible for infection or whether crushing of infected flies on the skin is an alternative or possibly the only method of transmission future observations will have to show but the suggestion by the authors that it is only leishmania forms and never the flagellate stages which infect is hardly in accord with evidence so far obtained and seems to be based on an incomplete review of the literature of the subject.]

C. M. W.

SUN (C. Jung) & WU (C. C.) Notes on the Study of Kala-Azar Transmission. Part II. Further Observations on the Natural Infection of *Phlebotomus chinensis* with *Leptomonas donovani* — *Chinese Med J* 1937 Nov Vol. 52 No 5 pp 665-673 With 2 figs. & 2 maps. [26 refs.]

It has been previously reported by the authors (this *Bulletin* 1937 Vol. 34 p. 44) that they have found seven instances of natural infection with *Leishmania donovani* of *Phlebotomus chinensis* in a village in N. China. In the present paper further observations of a similar kind are recorded from two other villages in the same district. In one village (Yaowanghsiang) 10 out of 483 specimens of *P. chinensis* were found infected, while in the other (Luchawa) 1 out of 54 was found infected. Flagellates were found in the mid-gut and at times in the hind-gut and in the proventriculus. In a footnote it is stated that *P. sergenti* var. *mongolensis* the predominant species in the village of Luchawa was found naturally infected in one instance. It is considered that in view of its wide distribution in kala azar districts of North Kiangsu *P. chinensis* is the chief if not the only vector of kala azar in China. It is recorded that during the year 1936 infection was produced in 26 of 135 specimens of this sandfly which were fed on kala azar patients.

C. M. W.

WU (C. C.) & SUN (C. Jung) Notes on the Study of Kala Azar Transmission. Part III. Experimental Infection of Chinese Sandflies of the Erect haired Division fed on Kala Azar Patients and Infected Chinese Hamsters.—*Chinese Med J* 1938. Mar Supp. No 2 pp 579-581 With 2 figs. [10 refs.]

Working in N China (Tangkiangpu) the authors have infected laboratory-bred sandflies (*Phlebotomus chinensis* *P. sergenti* var *mongolensis* and *P. sp*) by feeding them on cases of kala azar or experimentally infected hamsters. In the case of *P. chinensis* 19.28 per cent. became infected from human cases and 58.25 per cent from hamsters. The corresponding figures for *P. sergenti* var *mongolensis* were 1.17 and 32.68. Of *P. sp* only one of 28 fed on a hamster became infected. The infections were well developed and reached a maximum on the fourth to the sixth day. There was a tendency for the flagellates to spread forwards from the mid-gut rather than backwards to the hind-gut. Those in *P. sergenti* var *mongolensis* tended to die out when the blood was digested. The conclusions reached agree with those obtained previously by PATTON and HINDLE that the probable vector of kala azar in N China is *P. chinensis*. C M IV

THEODOR (Oskar) On African Sandflies.—III.—*Bull Entom Res.* 1938 July Vol 29 Pt 2 pp 165-173 With 7 figs

The paper deals with several collections of sandflies sent to the author for identification. With regard to one specimen identified as *Phlebotomus langeroni* Nitz, Dr Theodor states —

"This is the first record of a sandfly of the *major* group from a kala-azar area in the Anglo-Egyptian Sudan. One male only was found in a collection made by Sir Robert Archibald in El Fasher Sudan (2 v. 34). The occurrence of a sandfly of the *major* group the members of which are so far as is known responsible for the transmission of kala-azar was predicted by Adler & Theodor in 1931. It is not surprising that these sandflies are found so rarely. They are generally active only for a few hours at night and disappear very quickly after feeding, hiding in cracks, and only a meticulous search, particularly at night and with special knowledge of their habits, will generally reveal their presence.

In 1936 Parrot described *P. langeroni* var *orientalis* from Abyssinia. It cannot be decided whether our specimen belongs to this variety (although it is very likely) as this form was created mainly on the strength of a different distribution of the geniculated spines on the antennae, which are unfortunately lacking in our specimen.

RAYNAL (J) Contribution à l'étude des phlebotomes de la Chine du Nord. [*Phlebotomus* of North China.]—*Arch Inst Pasteur d'Indochine* 1937 Apr Vol 7 No 25 pp 37-69 With 10 plates, 30 figs & 1 map [70 refs.]

Four species of *Phlebotomus* are recognized in China north of the Yangtse. The greater part of this paper is occupied with detailed descriptions of the adult stages and these are accompanied by drawings and excellent photographs of the distinguishing characters: pharyngeal and buccal armature, hypopygia, spermathecae. But there is also a review of their biology. The most widespread and important species is *P. chinensis* which appears in May, is most abundant in June, and is becoming rare by August and September. It hibernates as a larva.

This species has been found infected in nature with flagellates morphologically identical with the developmental forms of *Leishmania donovani*; it has been readily infected by feeding on infected hamsters and on human kala azar patients. Experimental transmission by the bite has not been achieved but hamsters are easily infected by intra-peritoneal inoculation of crushed infected insects

V B Higglesworth

BERBERIAN (D A) Successful Transmission of Cutaneous Leishmaniasis by the Bites of *Stomoxys calcitrans*—*Proc Soc Experim Biol & Med* 1938 Mar Vol 38 No 2. pp 254-256

The author who had produced on himself an oriental sore by the intracutaneous inoculation of a culture of *Leishmania tropica* attempted to transmit the infection through the agency of *Stomoxys calcitrans* house flies and bed bugs. At various times seven *Stomoxys calcitrans* were allowed to feed on the sore and were then immediately transferred to an area of skin on the thigh of a volunteer. In all the seven flies inflicted eleven bites on the volunteer. Five and six months after the bites two papules appeared on the area bitten and in the first leishmaniasis were found. It would appear that *Stomoxys calcitrans* which is attracted to sores and readily feeds on them is capable of transmitting oriental sore mechanically and that it is possible that it may also transmit visceral leishmaniasis in the same manner

C M W

MALAMOS (Basilio) Versuche mit Leishmanien IV Versuche der Kala Azar Übertragung durch Zecken (*Rhipicephalus sanguineus*) [Experiments on the Transmission of Kala Azar by Ticks.]—*Arch f Schiffs u Trop Hyg* 1938 Jan. Vol. 42. No 1 pp 22-23

Experiments carried out by BLANC and CAMINOPETROS in Athens whereby they infected spermophiles with leishmania by injecting emulsions of dog ticks (*Rhipicephalus sanguineus*) made at varying intervals after they had fed on experimentally infected animals led them to conclude that this tick is the vector of human and canine kala azar in the Mediterranean district (this *Bulletin* 1931 Vol. 28 p 640). In the present paper the author records experiments he has made to transmit the infection from hamster to hamster by the bites of these ticks. The results have been entirely negative thus supporting the view that the infections resulting from experiments of the kind made by BLANC and CAMINOPETROS merely indicate the capacity of leishmania to survive for varying periods in the gut of certain blood-sucking arthropods.

C M W

SINTOX (J A) The Successful Transmission of Cutaneous Leishmaniasis by Inoculation to Man from a Natural Lesion occurring on a Dog in India—*Indian J Med Res* 1938. Jan Vol. 25 No 3 pp 787-789

Serosanguineous fluid containing leishmania from an ulcer on the nose of a dog living in the Punjab India was inoculated by cutaneous scarification into the skin of a European. Just over 12 months later

the first sign of an infection appeared at the inoculated area as a minute reddish spot. A small nodule developed and this ultimately broke down to form a small ulcer which healed after 20 months. Leishmania were found in the lesion up to 18 months. A volunteer inoculated from this lesion developed a papule after an incubation period of five months and in this again leishmania occurred.

C M IV

- I. CIOTOLA (Enrique) El kala azar y la ontogenia del tripanosoma. [Kala Azar and the Development of the Trypanosoma].—*Rev Méd Peruana* 1938. Mar Vol 10 No 111 pp. 101-114 [14 refs]
- II. — El kala azar y la ontogenia del tripanosoma [Kala Azar and the Development of the Trypanosoma].—*Premsa Méd Argentina*. 1938 May 4 Vol. 25. No. 18. pp 874-882. With 3 figs. [14 refs]

I. The author has made a diagnosis of kala azar in the case of three adults 35 33 and 22 years of age and in a child 2 years and 10 months old in Peru, this being the first record of the disease in the country. Except in the case of the child the outstanding symptoms appear to have been the existence of patches of erythema or urticaria on the body. The diagnosis was based on the supposed presence of leishmania in the peripheral blood. It is stated that the parasites had the form of leishmania or herpetomonas and, in one case of leptospira with a granule at the end, evolutionary forms which seem to indicate a development towards the trypanosome type. In no case was spleen or liver puncture carried out. The somewhat anomalous features of the disease and the remarks made about the parasites in the peripheral blood and the forms they assume throw doubt on the author's conclusions regarding the existence of kala azar in this part of S. America. It is evident that the presence of this disease in Peru cannot be accepted till more confirmatory evidence is forthcoming.

II. The second paper is an illustrated edition of the first, but the microphotographs purporting to show leishmania or herpetomonad forms in the peripheral blood do not incline the reviewer to alter the opinions he has expressed above.

C M IV

- NECAUD (P) LAUDAT (M) BOLGERT (M) & BRETON (P) Kala-azar autochtone chez un adolescent. Diagnostic tardif par les ponctions splénique et sternale. Très grosse augmentation du taux des protéines sanguines, des globulines et de l'euglobuline. Longue persistance du syndrome humoral. [A Case of Kala Azar in an Adult, showing Marked Increase in and Persistence of the Protein Content of the Serum].—*Bull et Mém. Soc Méd. Hôp. de Paris* 1938 May 16. 54th Year 3rd Ser No. 16. pp 770-777

The case described is that of a young man, 18 years of age who contracted kala azar in the South of France. The disease had run a course of over a year before a diagnosis was made by spleen puncture and the discovery of a heavy leishmania infection. The feature of the case to which special attention is called was the intensity of the various serological reactions which occur in this disease. Thus, the formal gel test resulted in a complete gelification of the serum within a few

seconds of the addition of one or two drops of formol. Associated with this the serum showed a very marked increase in the protoid content due to increase in both the globulin and euglobulin level. Treatment of the case by neostibosan resulted in rapid clinical improvement but the blood condition three months after the commencement of treatment still showed the marked diminution in the albumin globulin ratio. During the course of the illness the patient suffered from recurring attacks of severe furunculosis so much so that at one time a septicaemia was suspected. Similarly he was susceptible to various other infections such as influenza, angina, sinusitis and otitis. It was clear that the leishmania infection had taken a profound hold upon him and that in spite of the immediate response to antimony treatment this would have to be continued till there was evidence that the blood was returning to a normal condition. C M W

PIÉRI (J.) SARDOU & BOUDOURESQUES. Réflexions à propos d'un cas de kala-azar autochtone de l'adulte. Traitement par les produits stibiés. Guérison. [Autochthonous Kala Azar in an Adult.]—*Bull Soc. Path. Exot.* 1938. Feb 9. Vol. 31. No 2. pp 95-100

The case described is that of a man 27 years of age who contracted kala azar at Arles in the South of France. The results of various blood examinations and tests which are given in detail show that the case was a typical one of this disease. C M W

POINÇO (R.) & DE COUGNY. Un nouveau cas de kala-azar autochtone chez l'adulte (diagnostic sérologique, guérison par le traitement stibié). [Autochthonous Kala Azar in an Adult.]—*Bull et Mém Soc Méd Hôpit de Paris* 1938. Feb 14. 54th Year. 3rd Ser. No 5. pp 239-244

The detailed record of a case of kala azar in an adult 43 years of age from the south of France. C M W

LEMIÈRE (A.) LAPORTE (A.) & ISRAËL (R.) Sur un cas de kala-azar méditerranéen. [A Case of Mediterranean Kala Azar.]—*Bull et Mém Soc Méd Hôpit de Paris* 1938. July 11. 54th Year. 3rd Ser. No 24. pp 1218-1228

The case described is that of a man, 44 years of age who came to Paris from Valencia in Spain where it transpired subsequently he had contracted kala azar. The disease regarded for some time as malaria was finally diagnosed by the discovery of leishmania in smears of the bone marrow obtained by sternal puncture. A single dose of all that was then available of ureastibamine was given and this was followed by a course of neostibosan which failed to control the disease. A supply of ureastibamine having been obtained this was administered and resulted in an immediate response. Later antimony intolerance developed and as another sternal puncture failed to reveal parasites treatment was stopped. After about a month's failure to make headway a turn for the better suddenly occurred, the patient gradually returning to normal health. During the last four months it was noted that the various serological abnormalities engendered by the disease gradually disappeared, the last one being the high level of the euglobulin content of the serum. C M W



MOLLOW (W) Ueber einen autochthonen Fall von Kala Azar in Bulgarien. [An Autochthonous Case of Kala Azar in Bulgaria].—*Arch f Schiffs u Trop Hyg* 1938 July Vol. 42. No 7 pp 307-310

The case described is that of a soldier 28 years of age, who contracted kala azar in southern Bulgaria near the Grecian border. The diagnosis was made by the discovery of leishmania by liver and bone marrow puncture. Though it has been suspected for some years that kala azar occurs in Bulgaria, this is the first autochthonous case to be diagnosed by the discovery of the parasite. The author thinks that the disease will be found to exist on the Black Sea coast. Though a case of oriental sore was reported from Antos by JURUKOFF kala azar has not yet been identified there. C M II

PICCOLI (A) Leishmaniosi viscerale latente in adulto rivelata nel corso di una infezione tifoidea. [Latent Kala Azar in an Adult revealed in a Case of Typhoid Fever].—*Polidinico Soc. Prat.* 1938 May 23 Vol 45 No 21 pp 997-8 1001-2, 1005 With 1 fig. [17 refs]

The case described is that of a man 24 years of age who was admitted to an isolation hospital in Rome because of typhoid fever. This disease was diagnosed by blood culture and was treated by injection of typhoid vaccine. During the course of this treatment various blood examinations were made and on one occasion a blood film revealed several groups of leishmania. A diagnosis of kala azar was confirmed by spleen puncture. Specific treatment for this unsuspected disease was then instituted and the patient made an uninterrupted recovery. It is suggested that the rapid response to treatment is an indication of some kind of antagonism between the two diseases. [See also as regards malaria and enteric fever this *Bulletin* 1920 Vol 15 p 252.] C M IV

KIRK (R) Primary Cutaneous Sore in a Case of Kala Azar.—*Trans Roy Soc Trop Med & Hyg* 1938 Aug 25 Vol 32 No 2 pp 271-272. With 2 figs. on 1 plate

The case reported is that of a youth from the Blue Nile district of the Sudan who developed over the left malar region a slowly enlarging papule. The patient began to suffer from fever and five months after the first appearance of the papule he was admitted to hospital and found to be suffering from visceral leishmaniasis. At the same time, leishmania were found in the skin lesion. The case is of interest as being one of cutaneous and visceral leishmaniasis in the same patient. Whether the sore was of the nature of a primary lesion leading later to a generalised infection with the same organism, or whether the two organisms of oriental sore and kala azar were present concurrently could not of course be determined. C M IV

DA COSTA (A. M) Sur l'agglutination des Leishmania. Agglutination flagellaire et agglutination somatique. [Leishmania Agglutination—Flagellar and Somatic].—*C R Soc Biol.* 1938 Vol 128 No 16 pp 209-211 With 2 figs.

Agglutinating sera for leishmania were prepared by means of the culture flagellates either unbeated or heated to 60°C. for half an hour

Tested against a suspension of flagellates the serum prepared with unheated flagellates agglutinated in the form of flocculi which quickly sank in the tube while that prepared with heated flagellates gave an agglutination in the form of granules which remained in suspension. In the first type the flagellates were found to have the flagella directed inwards while in the second the flagella were directed outwards. This indicates that there are in the leishmania both a thermostable flagellar antigen and a thermolabile somatic antigen. C M W

GASPERINI (G. C.) Soppressione del fenomeno dell' inversione della flocculazione nei sieri filtrati di soggetti colpiti da leishmaniosi interna. [Absence of the Phenomenon of "Inversion of Flocculation" in Filtered Sera of Kala Azar Subjects.]—*Ann d'Igiene* 1937 Oct Vol. 47 No 10 pp 505-506

It has already been shown by a number of authors that the formol gel reaction of the serum of kala azar subjects is rendered less intense if the serum is subjected to ultrafiltration before the test is made. The present author shows that the reaction of CAMINOPETROS is also modified by filtration of the serum. This reaction is obtained by adding serum drop by drop to 2 cc. of a 1-4 per cent. solution of sulfarsenol. There is produced at once a turbidity which increases as more drops are added to an opacity and to flocculation. Finally a point is reached at which the flocculi dissolve and the fluid is again clear. This clearing termed by CAMINOPETROS inversion of flocculation does not occur with filtered serum while as in the case of the formol gel reaction the primary turbidity and flocculation is less intense. It would appear that the molecules of protein responsible for these reactions are not all of the same size. C M W

GASPERINI (G. C.) Scomparsa della reazione di Henry nei sieri filtrati di soggetti colpiti da *Leishmania donovani* [Disappearance of the Reaction of Henry in Filtered Sera of Kala Azar Subjects.]—*Ann d'Igiene* 1937 Oct. Vol. 47 No 10 pp 507-508

The paper records the fact that the reaction of Henry carried out with a solution of melanin prepared from the pigment of the cuttle fish which has given the author good results with the serum of cases of malaria no longer occurs with the sera of those cases of kala azar in which it is positive if the serum is subjected to ultrafiltration before the test is made. C M W

PAI (H. C.) & HU (C. H.) Absence of Leucolysin in Kala-Azar Serum—*Chinese Med J* 1938, Mar Supp. No 2, pp 151-157

The authors cannot agree with MAGGIORE and SINDONI that the reduction of the leucocytes in kala azar is due to the presence of leucolysin. Neither by direct observation of leucocytes in serum, nor by other means were they able to demonstrate the presence of such a substance. On the other hand they have found that in estimating the number of leucocytes there is a tendency for the polymorphonuclears to adhere to the surface of the glassware. This fallacy which may be avoided to some extent by polishing the surface or coating it with paraffin accounts for most of the apparent reduction in the number of leucocytes. C M W

HU (C. H.) & PAI (H. C.) Further Study on the White Blood Cells of Hamsters experimentally infected with Kala Azar with Description of Technique for observing Identical Cells in Supravitality and Ordinarily Stained Films.—*Chinese Med J* 1938. Mar Supp. No 2, pp 131-149 With 2 coloured plates [14 refs.]

A study of the blood of hamsters suffering from experimental kala azar shows, apart from anaemia and leucopenia a reduction in the percentage of the small lymphoid cells due probably to an increased destruction of the older cells and hypertrophy of the smaller lymphoblasts to replace these. There is a definite increase in the percentage of large lymphoid cells and lymphoid cells with enlarged neutral red bodies. Eosinophils are present only in small numbers but there is an increase in the polymorphonuclear neutrophils due to extra-medullary myelocytic proliferation in the spleen and elsewhere. This extra-medullary proliferation does not occur in man and accounts for the difference between the neutrophilic granulocytic response of human cases of kala azar and of experimentally infected hamsters.

C M II

GIRAUD (Paul) & GAUBERT Les accidents de la ponction de rate. [Dangers of Spleen Puncture].—*Arch Méd Gén. et Colon.* 1938. Vol. 7 No 1 pp 1-8.

In this paper the authors discuss the dangers of spleen puncture as practised for the diagnosis of kala azar. They have carried out the procedure in over 300 cases and on three occasions the operation has been the direct or indirect cause of death. In one case, a child six years of age, a small laceration 3 millimetres in length in the spleen capsule led to a half litre haemorrhage into the peritoneal cavity and death in three days. In the two other cases, one an infant of 11 months seriously ill when first seen, and the other a child of two years with developing broncho-pneumonia, the operation merely precipitated an inevitably fatal issue but the case of the older child was a tragedy. The authors conclude that all other methods of demonstrating parasites should be attempted before having recourse to spleen puncture which must be carried out with the strictest precautions. These include careful immobilization of the patient, rest in bed for 24 hours after the operation with application of ice to the abdomen and a fluid diet and haemostatic medication, such as injection of horse serum and administration of calcium chloride by the mouth. If symptoms of haemorrhage supervene transfusion should be carried out. If these persist the advisability or otherwise of splenectomy should be considered. As regards purely empirical treatment the authors point out that the risk of spleen puncture is less than that of attempting to carry out antimony treatment, often a long and difficult procedure without the confidence which is given by the discovery of the parasite and the knowledge thus attained that the case is indubitably one of kala azar.

C M II

GIRAUD (P) BOUDOUQUES BLANC & BERGIER. Le diagnostic du kala-azar par la ponction ganglionnaire à propos de deux nouvelles observations. [Diagnosis of Kala Azar by Gland Puncture].—*Bull. Soc. Path. Exot.* 1937 Oct. 13 Vol. 30. No 8. pp. 680-684.

In an earlier paper the authors drew attention to the diagnostic possibilities of puncture of lymphatic glands in kala azar. In the

present paper two cases are mentioned in which this procedure proved reliable as regards demonstration of leishmania and simple to carry out. In all, four cases in children have been easily diagnosed and the progress of treatment controlled by this little operation. The drawback is that in certain cases in children and generally in adults there is no enlargement of the glands so that the method is not applicable in every case. C M W

ANDERSON (C) & DISDIER (C) Contribution à l'étude de la méthode de Nattan Larrier pour le diagnostic sérologique des leishmanioses. [The Nattan-Larrier Method of Serological Diagnosis of Leishmaniasis.] — *Arch Inst Pasteur de Tunis* 1938, June. Vol. 27 No 2. pp 203-210

In 1933 NATTAN LARRIER and GRIMAUD-RICHARD (this *Bulletin* 1934 Vol. 31 p 230) described a serological test for the diagnosis of kala azar which depends upon the fixation of complement in the serum of a case of the disease when this is mixed with the serum of a rabbit which has been submitted to intravenous injections of cultures of leishmania. The authors have carried out the test in 79 cases of various kinds including 9 cases of kala azar and have found that it is not sufficiently specific for kala azar to be of value for diagnostic purposes. C M W

D OELSCHITZ (M.) Diagnostic précoce et traitement d'attaque du kala-azar. *Éléments de prophylaxie des leishmanioses viscérales* [Early Diagnosis, Treatment and Prophylaxis of Kala Azar] — *Mouvement Sanitaire* 1938 Apr Vol. 15 No 168 pp 220-228

The author who has had an unrivalled experience of kala azar in the South of France discusses in this paper the prophylaxis of the disease. He comes to the conclusion that in view of the uncertainty as to the method of transmission the only available methods of prevention are the early identification of cases and the treatment of these as rapidly as possible in order to render them incapable of handing on infection to others. The various diagnostic procedures are reviewed and the conclusion is reached that the most reliable indication of the early stage of infection is the discovery of the parasite by sternal puncture and the increased density of the serum under the influence of organic antimony compounds as judged by photometric methods. The actual procedure adopted by the author is to add to a 1 in 1 000 dilution of serum a 1 in 100 solution of urea stibamine. A density of 0 to 4 for normal individuals and inevitable accidents which regularly occur on account of the occasional and inevitable accidents which follow spleen puncture even when every precaution is taken. For the treatment of the disease the best course to follow is to push the drug used to the limits of tolerance the object being to eradicate the infection by a single course rather than by more than one. In this manner the danger of producing antimony resistant strains of parasite in the patient is avoided. As regards the actual drug the author's experience is in favour of urea stibamine which is stated to be no longer available in France. It is claimed that the tolerance to organic antimonials is considerably increased by the concurrent administration of injectable

liver extracts. The fall in the density of the serum antimony mixture as judged by photometry is the best test of the efficacy of the treatment adopted.

C M W

KIKUTH (Walter) & SCHMIDT (Hans) Solustibosan ein Fortschritt der Kala Azar Behandlung auf Grund chemotherapeutischer Forschung [Solustibosan, an Advance in Kala Azar Treatment based on Chemotherapeutic Research.]-*Arch. f. Schiffs- u. Trop Hyg* 1938 May Vol. 42. No. 5 pp 189-201 [22 refs.]

In this paper the authors show how it has been found possible to use leishmania-infected hamsters for testing kala azar remedies and how by this means the new drug solustibosan, which is in many ways superior to neostibosan has been evolved. The whole technique is described in detail so that now for the first time there is available a method of standardization of preparations which may or may not be useful for the treatment of this disease. Solustibosan or 581 is a sterile isotonic neutral solution in water of a pentavalent antimony compound of such a concentration that 1 cc. contains 20 mgm. of antimony. Thus 6 cc. corresponds to a dose of 0.36 of neostibosan. The technique consists in infecting a series of European hamsters by the injection of an emulsion of the organs of an infected animal. The degree of infection is estimated by liver puncture performed six weeks after injection. In another six weeks' time the animals are as a rule in a suitable state of infection for testing drugs. These are administered subcutaneously once or twice a week or even more frequently for one or two weeks, the action being controlled by liver puncture and finally by examination of the organs post mortem for the presence or absence of parasites. The infection in untreated animals runs a very uniform course and shows little if any tendency to remissions. Even with very heavy infections there are no visible symptoms apart from the enlarged liver and spleen. Blood examinations, however reveal certain changes in the cell content. When the animals die it is usually from some cause other than the actual leishmania infection.

This paper which makes an important contribution to the technique of chemotherapeutic research, and an earlier one on the same subject (this *Bulletin* 1938, Vol 35 p 182) must be studied in detail by all who are interested.

C M W

ERMEX (Johannes) Die Wirkung von 3- und 5wertigem Antimon auf das weisse Blutbild bei gesunden und mit kala-azar infizierten Hamstern. (The Influence of Tri- and Pentavalent Antimonials on the Leucocytes of the Blood in Healthy and Kala Azar Infected Hamsters.)-*Ztschr f. Immunitätsf u. Experim. Therap* 1938. July 8. Vol. 93 No 3/4 pp 209-228. With 5 figs. & 7 charts. [22 refs.]

It has already been shown that the pentavalent antimony derivatives, such as neostibosan, are active agents for the treatment of kala azar both in man and in experimentally infected hamsters while the trivalent compounds, like fousadin, are inactive. Working with hamsters, the author has investigated the blood changes which are brought about by the administration of these drugs with a view to correlating these with the differences in therapeutic action. Both in

healthy and in infected hamsters it was found that administration of neostibosan caused a marked histiocyte response while fonadin failed to bring about more than the appearance in the blood of a few histiocytes. Fonadin however produced a marked monocytosis and leucocytosis. Neostibosan was responsible for some increase in the monocytes and the leucocytes which are below normal in infected animals were brought to the normal level. It appears therefore that the activity of the pentavalent compounds is associated with a histiocyte response in the blood and the author concludes that the success attending the use of these drugs in the treatment of kala azar is due to a double action—a direct one on the parasites and an indirect one upon the tissues.

- WANG (C. W.) & LEE (C. U.) Neostibosan and Experimental Kala-Azar in Chinese Hamsters. I Normal Hamsters.—*Proc Soc Exper Biol & Med* 1938, June Vol 38, No 5 pp 670-674  
 — & — Neostibosan and Experimental Kala-Azar in Chinese Hamsters. II Infected Hamsters.—*Ibid* pp 674-678

Experiments made some years ago by SURZY (1926) appeared to show that sodium antimony tartrate and other antimony compounds which were capable of curing human kala azar failed to influence the experimental disease in Chinese hamsters. HINDLE working with JONASOV had similar results. ROEHL (1929) on the other hand found that he was able to keep European hamsters free from infection by the use of a number of antimony derivatives including neostibosan. More recently HIKUTH and SCHMIDT (*supra*) have had similar results with neostibosan as well as with neostibosan. They have expressed the opinion that the failure of the early workers was due to the difference in the type of hamster used.

The authors of the present papers describe experiments which they have carried out with Chinese hamsters. These indicate that it is possible to administer to Chinese hamsters much larger doses than those employed by SURZY and HINDLE. Thus in the first paper it is shown that it would probably be safe to administer subcutaneously or intramuscularly twice a week to a hamster 0.4 gm of neostibosan per kilo of body weight. With dosage of this order given till a total of 7 gm per kilo of body weight had been reached it was possible to bring about a cure in 50 per cent of these experimentally infected Chinese hamsters which survived the course of treatment. The most reliable test of cure was found to be the failure to contract infection by hamsters inoculated with liver and spleen emulsions of the treated animals.

- CURASSON (G) SISSOKO (B) & LAURENCE La leishmaniose canine à Dakar [Canine Leishmaniasis at Dakar]—*Bull Soc Path Exot* 1937 Oct 13 Vol 30 No 8 pp 634-636

Canine visceral leishmaniasis was first recorded by LAFONT and HECKENROTH in Senegal in 1915. Since then HECKENROTH (1919) and NOD and CURASSON (1920) and MARCEL LEGER (1922) have noted other cases. In the present paper the authors state that they have examined 83 dogs of mixed breed in the *fourniers* at Dakar and have discovered 5 cases of visceral leishmaniasis. All the animals were positive as regards serological tests the diagnosis being confirmed

by the discovery of leishmania by examination of the spleen and bone marrow. Of the five animals four were in poor condition, while one appeared to be in good health. C M IV

DONATIEUX (A.) & LESTOQUARD (F.) Remarques sur l'évolution de la leishmaniose générale du chien. [Evolution of Generalized Leishmaniasis of the Dog.]—*Bull Soc Path Exot.* 1938. Mar 9 Vol 31 No 3 Also in *Arch Inst Pasteur d'Algérie* 1938 June Vol 16 No 2 pp 191-202.

The authors have kept under observation in Algiers for a long period a number of dogs which were found to have a natural leishmania infection with a view to obtaining a correct idea of the natural course of canine kala azar. It was evident that after infection a dog might show no symptoms whatever for a silent period of weeks or months. The length of this period had no relation to the intensity of infection which was very heavy in certain dogs showing no symptoms. It seemed to depend rather on the degree of reticulo-endothelial response. When symptoms appeared the disease in some cases progressed steadily till the animal died, but in others there would be a remission of symptoms followed by a second silent period. Under natural conditions exposure to reinfection was constant and far from there being any immunity a reinfection was sometimes followed by an exacerbation of the symptoms. It was evident that many dogs must be infected without showing any symptoms and that on this account it was impossible to carry out any prophylactic measures which were based on the detection of infected animals without examining every dog in a district. C M IV

DONATIEUX (A.) & LESTOQUARD (F.) Observ<sup>on</sup> <sup>un</sup> cas de leishmaniose générale du chien accompagnée d'un néoplasme. [Generalized Leishmaniasis of the Dog accompanied by Neoplasms.]—*Bull Soc Path Exot* 1938 Mar 9 Vol 31 No. 3 pp 217-220. Also in *Arch Inst Pasteur d'Algérie* 1938 June Vol. 16. No 2. pp 203-209.

During the course of treatment of a dog for visceral leishmaniasis which had been contracted in Algeria the animal developed a number of malignant tumours many of which were visible on the skin. A particular feature of this case was the intensity of the leishmania infection and a marked enlargement of the lymphatic glands. The animal was destroyed and it was found that all the organs including the neoplasms, which showed the characters of reticulo-endothelioma were very heavily infected with parasites. C M II

FIGOUXY (L.) Reviviscence de lésions cutanées ou ecthyma stibé au cours du traitement de la leishmaniose canine par les antimoniaux. [The Effect of Antimony Treatment of Canine Kala Azar in causing Outbreaks of Skin Lesions or the Aggravation of those already existing.]—*C R Soc Biol* 1938 Vol. 127 No. 2 pp 105-108.

The author has noted that during the treatment of dogs for kala azar by the injection of antimonials skin lesions, in the form of pustules which break down and form ulcers are likely to appear on various parts of the body. These are of a temporary nature and heal in a few days.

They are regarded as an indication of the toxicity of the drug to which the animals quickly adapt themselves. The author has noted that parasites occur in the tissues of these ulcers. He regards these as concentrations of parasites brought about by the inflammatory reaction of the skin lesions. He does not consider the lesions as related in any way to the concentrations of parasites which are known to occur in the skin of dogs suffering from visceral leishmaniasis.

C M II

KHAW (O K) *Myospalax fontanieri* Milne-Edwards and *Citellus dauricus mongolicus* Milne-Edwards. Two New Laboratory Animals for Experimental Kala-Azar—*Chinese Med J* 1933. Mar Supp No 2. pp 593-600 With 12 figs. on 6 plates. [13 refs.]

The author records experiments with the mole rat (*Myospalax fontanieri*) and the ground squirrel (*Citellus dauricus mongolicus*) both of N China which show that they are susceptible to *Leishmania donovani* infections. The former is as easily infected as the hamster the latter less so. The mole rat moreover has certain advantages over the hamster in that it is as large as the guineapig C M IV

CHAGAS (E) DA CUNHA (A Marques) CASTRO (G de Oliveira) FERREIRA (L. Castro) & ROMANA (C.) Leishmaniose visceral americana (Nova entidade morbida do homem na America do Sul) Relatório dos trabalhos realizados pela comissão encarregada do estudo da leishmaniose visceral americana em 1936 [South American Kala Azar]—*Mem Inst Oswaldo Cruz* 1937 Vol 32. No 3 pp 321-390 With 82 half tone illustrations 9 diagrams & 2 folding maps on 45 plates.

In this long illustrated report the authors review the present knowledge on the subject of kala azar in S America. The existence of this disease there had been suspected for many years, particularly by Carlos CHAGAS (1911-1912) who considered that certain cases of unexplained splenomegaly were probably due to visceral leishmania infections though he had not been able to discover the parasite. In 1913 MIGONE (this *Bulletin* 1913 Vol. 1 p 635) announced the discovery of a fatal case of kala azar in Asuncion the capital of Paraguay. The infection in this case appears to have occurred in Matto Grosso Brazil. MAZZA and ARIAS in 1926 (this *Bulletin* 1927 Vol. 24 p 135) reported two cases in children in the Argentine in the province of Salta. Eight years later in 1934 INDA VÍVOLI and VACCAREZZA (this *Bulletin* 1934 Vol. 31 p 659) gave an account of the pathological findings in a fatal case in an adult also from Salta. More recently ROMANA (1936) has recorded nine cases from the Chaco district of the Argentine. In 1934 PENNA (this *Bulletin* 1935 Vol 32 p 481) announced the discovery of leishmania in a number of the liver specimens which had been removed by viscerotomy from fatal cases of undiagnosed fevers and which had been examined histologically for evidence of yellow fever. In a series of 47 000 specimens leishmania were found in 41. It was evident therefore, that kala azar existed in Brazil and accordingly a commission was set up to investigate the distribution and characters of the disease in Brazil and the Argentine. A great deal of information has been collected



and this is all described and recorded in the present report. As far as can be judged at present the disease in S. America differs very little if at all, from kala azar of the Old World, while the study of the organism does not reveal any fundamental differences from *Leishmania donovani*. By means of serological tests with immune sera prepared by inoculating cultures into animals it is claimed that the S. American parasite can be differentiated from other species of *Leishmania* and on this account the name *Leishmania chagasi* has been given it. It would appear however that the differences noted are not greater than those which have been observed to exist between different races of a single species. Furthermore, the failure of animals to become infected when inoculated, which has been adduced as an argument in favour of the distinct species, loses its value in view of the recent successful infection of animals by DA CUNHA and ADLER. The S. American disease is said to be endemic in character in contrast to kala azar of the Old World which is said to be epidemic, but this is not a correct view of the situation, for in the Old World the disease is rarely epidemic and then only at intervals. In most cases it is endemic, the cases occurring often quite sporadically. The differences between the two diseases mucocutaneous leishmaniasis of S. America and oriental sore of the Old World, are much more pronounced than any supposed differences between the corresponding forms of the visceral disease. On this account there is more justification for the recognition of *Leishmania brasiliensis* as distinct from *Leishmania tropica* than for admitting the species *Leishmania chagasi* as different from *Leishmania donovani*.

As regards the distribution of the disease the viscerotomy service had shown a fairly general distribution in N.E. Brazil from Pará to Bahia with concentrations in N.E. Pará, Ceará, Sergipe and Bahia. Actual cases were discovered by the commission in the same regions. Other cases also were brought to light in the Chaco district of the Argentine.

The paper gives a full account of the fauna and flora of the districts studied, describes and illustrates the types of country towns and habitation in which cases of the disease were found, gives an account of the meteorological conditions which prevail and generally lays the foundations of future work on the epidemiology of this most interesting disease.

C. M. IV

- i. DR. OLIVEIRA (Ary Coelho) Um caso de leishmaniose visceral americana [A Case of American Kala Azar].—*Hospital*. Rio de Janeiro. 1933. Mar Vol. 13 No. 3. pp. 465-470. With 3 figs.
- ii CHAGAS (E) & CHAGAS (A. W.) Notas sobre a epidemiologia da leishmaniose visceral americana em Mato Grosso. [Epidemiology of American Kala Azar in the Mato Grosso.].—*Ibid* pp 471-480 With 6 figs. (1 map)

1. The first paper is a record of a typical case of kala azar in a boy of 9 years of age from the Coxim municipality of the Mato Grosso district of Brazil. The case was an isolated one in a forest region, an illustration of the sporadic character of the disease in S. America. *Leishmania* were found by puncture in the spleen and liver and also in an excised lymphatic gland. Treatment with foudan and neortibosan proved satisfactory.

ii. The second paper is a detailed epidemiological study of the case which occurred in an isolated thatched hut in a wooded and bush covered district. The various blood-sucking insects encountered including an unidentified species of *Phlebotomus* are described, as also the various animals domestic and wild which were likely to come in contact with the patient. The topographical features of the country are shown in a number of illustrations.

C M II

DEANE (L.) Leishmaniose visceral neotropicala. [Neotropical Kala Azar]—*Hospital Rio de Janeiro* 1938 Feb Vol 13 No 2. pp 315-321

This is a general account of kala azar based on cases seen in the N.E. region of Brazil, where the disease has been shown to be endemic. Clinically it resembles the Indian or Mediterranean forms of the disease and as regards symptomatology diagnosis and treatment there does not appear to be any marked difference from the disease long known in the Old World.

C M II

DA CUNHA (Aristides Marques) Infecções experimentaes na leishmaniose visceral americana. [Experimental Infections with S. American Kala Azar]—*Brasil-Médico* 1938. June 18 Vol 52. No 25 p 571

ADLER (S.) Smear of Spleen of Syrian Hamster showing the Parasite (the so-called *Leishmania chagasi*) of South American Kala Azar [Laboratory Meeting Demonstration.]—*Trans Roy Soc Trop Med & Hyg* 1938 June 25 Vol 32. No 1 p 4

In the first of these papers the author announces the successful infection with the leishmania of S American kala azar of the hamster the rhesus monkey and the dog. The author of the second paper makes a similar announcement regarding the Syrian hamster which was infected by cultures of leishmania sent from S America.

The importance of these results lies in the fact that the insusceptibility of laboratory animals was considered to be one of the features distinguishing the S. American parasite from *Leishmania donovani* of the Old World.

C M IV

DA CUNHA (A. M.) Sur les infections expérimentales de leishmaniose tégumentaire américaine. [Experimental Infections with American Cutaneous Leishmaniasis.]—*C R Soc Biol* 1939 Vol. 128. No 16. pp 211-213 With 1 fig

With cultures of the parasite of S American cutaneous leishmaniasis a number of animals were inoculated. A rhesus monkey and a dog developed cutaneous nodules in which leishmania occurred. With cultures of the parasite of the local visceral leishmaniasis a similar nodule was produced on the skin of a rhesus monkey. Thus inoculated into the skin the parasites of both cutaneous and visceral leishmaniasis have given rise to local lesions.

C M IV

HOARE (Cecil A.) Early Discoveries regarding the Parasite of Oriental Sore. (With an English Translation of the Memoir by P. F. Borovsky "On Bari Sore, 1893.")—*Trans Roy Soc. Trop Med. & Hyg.* 1938. June 25 Vol. 32. No 1 pp 67-92. With 3 plates. [43 refs.]

The author's purpose in publishing this paper is to call attention to the observations made by two Russian medical men on oriental sore and to give them proper credit for their discoveries and suggestions. The first of these is P. F. BOROVSKY a military surgeon stationed at Tashkent, who in 1893 published in the Military Medical Journal, which is almost inaccessible to readers outside Russia, an account of his studies. The author has translated this paper and the literal translation produced here makes the paper available for the first time to those who are not conversant with the Russian language. It gives an accurate description of the disease, its clinical features and pathology but of special interest is the account of the causative agent which is described as a small body containing a nucleus and a process running from the nucleus to the periphery of the parasite. It is possible to recognize in this description the leishmania as we know it to-day but certain statements are difficult to explain and may in part be due to imperfect fixation of some of the material used for the observations. Thus, all that may be visible is the nucleus of the parasite, giving the appearance of a coccus as indeed was recognized by BOROVSKY or with the nucleus the kinetonucleus may appear as a rod projecting from the nucleus, producing the impression of a process, possibly a flagellar process, arising from a rounded coccus-like body. In both these cases the cytoplasm of the parasite being badly fixed is not visible. These appearances may account for some of the discrepancies in the description, but beyond this a clear picture of the entire leishmania is given. Furthermore impressed with the structure of the parasite and its general appearance, the author referred the parasite to the class protozoa. To BOROVSKY then, is due the credit of first describing accurately the parasite of oriental sore and of recognizing it as a protozoon. The parasites had been previously seen by CUNNINGHAM in India in 1885 but he had been so much impressed with their presence in large numbers in cells which we now know as macrophages that he had concluded that the large macrophages were mycetozoa and the small bodies subsequently named leishmania, within them were spores of this mycetozoon. FIRTH again in 1891 made similar observations and accepted CUNNINGHAM's conclusions. Finally in 1903 WRIGHT in ignorance of BOROVSKY's work and of LEISHMAN's account of the parasite of kala azar gave an accurate description of the parasite of oriental sore.

The study of the literature of the early discoveries necessitated a review of the nomenclature of the parasite of oriental sore and kala azar and in this paper the author has given a complete account of the various terms and names employed and the numerous synonyms of *Leishmania tropica* and *Leishmania donovani*.

Another paper referred to is one by SAULCER who was a colleague of BOROVSKY at the Tashkent Military Hospital. He also turned his attention to oriental sore and by a series of ingenious arguments arrived at the conclusion that oriental sore was the result of the bite of some nocturnal insect which was an intermediate host in the same way as an intermediate host is recognized for malaria. It thus comes

that the two Russian observers referred to were the first to recognize the parasite of oriental sore to give an accurate description of its structure to realize its protozoal nature and to suggest its transmission by a blood sucking intermediate host.

The paper contains a sketch of the life of BOROVSKI (Appendix 1) a photograph of him and reproduction from his paper of illustrations of sections of oriental sore and of the parasite described. C M II

HYRA (R) & DREW (C B) Preliminary Notes on Dermal Leishmaniasis in the Anglo-Egyptian Sudan.—*Trans Roy Soc Trop Med & Hyg* 1938 Aug 25 Vol. 32, No. 2, pp 285-270 With 9 figs on 4 plates & 1 sketch map [19 refs.]

It is noted that in the Sudan cases of cutaneous leishmaniasis fall into two groups. In the one the skin lesions appeared in cases of kala azar after treatment and resembled the post kala azar dermal leishmaniasis of India. In the other group of cases there is no previous history of kala azar and the lesions resemble oriental sore. This disease does not occur with any frequency elsewhere than in Darfur where cases of muco-cutaneous leishmaniasis or espundia and kala azar have also been reported. Cases of espundia have previously been noted in Sennar the home of kala azar in the Sudan while in the present paper the first case of typical oriental sore is reported from this district. It thus appears that in the Sudan there is no clear separation of visceral cutaneous leishmaniasis like that observed in India and some other regions. The paper is illustrated by a number of photographs showing the character of the skin lesions met with.

C M IV

MONTE (Giuseppe) Bottone d'Oriente in un militare nazionale.—[Oriental Sore in an Italian Soldier].—*Arch Ital Sci Med Colon e Parasit* 1937 Oct. Vol. 18, No. 10 pp 638-637 With 1 fig

Cases of oriental sore amongst the indigenous population of Agamé Abyssinia have already been reported by POGGI (thus *Bulletin* 1938 Vol. 35 p 183). The present paper describes the case of an Italian soldier who contracted the disease in the form of a lesion on the nose in the same district.

C M IV

VIGNE (P) & DUSAN (J) Double bouton d'Orient du visage [Double Oriental Sore on the Face].—*Marseille Méd* 1937 Sept 5-15 Vol. 74, No. 25-26 pp 202-204 With 1 fig

The case described is that of a man 45 years of age who contracted oriental sore on both cheeks about four months after returning to Marseilles from a visit to Crete.

C M II

HERVÉ. Note sur la leishmaniose cutanée au Cameroun. [Cutaneous Leishmaniasis in the Cameroons].—*Ann de Méd et de Pharm Colon* 1937 July-Aug-Sept. Vol. 35, No. 3 pp 928-934 With 6 figs.

In this note the author states that as long ago as 1930 or 1932 he suspected oriental sore in the case of certain nodular ulcerative or eczematous lesions he had met with in the Cameroons. All cases were

in individuals coming from the south of the territory. At that time it was not possible to discover leishmania in any of the lesions. In 1935 and 1936 he has again seen a number of cases from the south, over 20 and has been able to confirm his original diagnosis by the discovery of the parasites. A careful examination by spleen puncture of cases of splenomegaly has failed to reveal any instance of visceral infection.

C M W

PAONI (A.) Osservazioni culturali con rilievi epidemiologici sulla leishmaniosi cutanea e viscerale in Sardegna. [Observations on the Epidemiology of Leishmania Infections in Sardinia and the Culture of the Parasite].—*Giorn. di Batteriol. e Immunol.* 1933. June. Vol. 20. No. 6 pp. 1159-1172. [10 refs.] English summary (7 lines)

Employing N N N medium, a medium composed of alkaline goat's or cow's milk and an N N N medium in which milk was used in the place of blood, cultures of leishmania were obtained from a case of oriental sore and one of kala azar seen by the author in Sardinia. The method of spread of the two diseases in the island is discussed in the light of the various blood sucking arthropods which occur there without however arriving at any definite conclusion. C M W

EVANS (R. Byron) Cutaneous and Subcutaneous Leishmaniasis.—Reprinted from *Brit. J. Dermat. & Syph.* 1933. Jan. Vol. 50 pp. 17-22. With 2 figs. [10 refs.]

The case described is that of a man who developed a number of ulcers associated with surrounding subcutaneous nodules on the arm, neck and legs after residence in Iraq. In many respects the arm lesions resembled in character and distribution tubercles of the hypoderm and Bazin's disease with involvement of the skin. A diagnosis of oriental sore was established by discovery of leishmania in the lesions.

C M W

PANJA (Ganapati) An Unusual Case of Dermal Leishmaniasis of the Tongue.—*Jl. Indian Med Assoc.* 1933. Mar. Vol. 7. No. 8. pp. 368-369. With 1 fig.

The case described is that of a Hindoo who suffered from dermal leishmaniasis for eight years following treatment of kala azar with urea stibamine. There was patchy depigmentation of the skin and numerous lesions occurred in various parts of the body. Finally there developed on the dorsum of the tongue nodular lesions in which leishmania were demonstrated. Though lesions on the mucous membrane of the palate, lips and cheek have been described in this condition, this appears to be the first notification of lesions on the tongue. For treatment of post kala azar dermal leishmaniasis the author advocates the concurrent use of pentavalent arsenic and antimony compounds. He claims that the combined action of the two drugs brings about a more rapid response than the use of the antimony derivatives alone.

C M W

BRUMPT (Lucien) Coexistence d'une sténose oesophagienne et de boutons d'Orient guéris simultanément après traitement stibié [Simultaneous Cure of Esophageal Stricture and Oriental Sores with Urea Stibamine].—*Bull Soc Path Exot* 1938 May 11 Vol. 31 No 5 pp 366-369

The case described is a remarkable one of a man who having oriental sore in the shape of a lesion on a finger and another on the dorsum of the foot, suddenly found difficulty in swallowing, a condition which developed to an extreme degree. Examination revealed a complete organic blockage of the oesophagus at the junction of the middle and lower thirds. This was regarded as of a malignant nature. Gastrostomy was performed and the patient sent to Paris for radium treatment. No improvement occurred, when the suggestion was made that there might be some connexion between the hitherto neglected oriental sores and the stricture in the oesophagus which had already persisted for six months. The two sores were found to contain numerous leishmania and it was desired to examine the oesophagus for these parasites. The patient refused any further oesophageal examination. Treatment by injections of urea stibamine was instituted. This produced an inflammatory reaction in the sores which afterwards commenced to heal. Ten days after the commencement of treatment the patient was able to swallow a little water and at the end of the month could eat a meal at a restaurant. About three weeks later the two sores had completely healed. The paper discusses the possibility of the oesophageal condition being one of the rare instances of involvement of a mucous membrane in oriental sore of the Old World. It is unfortunate that it was not possible to examine the oesophageal lesion for leishmania.

C M IV

MANSON BAHR (Philip) Oriental Sore (Dermal Leishmaniasis), a New Method of Treatment with a Note on its Lymphatic Dissemination.—Reprinted from *Festschrift Bernhard Nocht z 80 Geburtstag von seinen Freunden u Schülern Hamburg* 1937 pp 278-282. With 4 figs. on 1 plate

After considerable experience in the treatment of oriental sore by many of the well recognized methods the author expresses himself in the present paper as being unsatisfied with any of these. He has however found that good results follow the use of cignolin, which is a refined product of chrysophanic acid. It had been introduced for the treatment of psoriasis and fungus skin diseases. There are two preparations of this a paint and an ointment. The paint is a mixture of cignolin grams 4 ichthyol grams 8 and oleum cadmi mmmms 40 to which is added benzoh rect to bring the mixture to 1 ounce. The paint is applied daily to the whole area of the sore but not to the surrounding skin, by means of a camel-hair brush after the sore has been thoroughly cleaned. For more chronic types of sore the ointment is used. This consists of cignolin grams 4 zinc oxide half an ounce and olive oil half an ounce. By means of a number of descriptive cases the good results of this treatment are demonstrated. Attention is drawn to the enlargement of the lymph nodes situated in the drainage area of the sore. These were particularly noticeable in one of the cases but it was not possible to demonstrate leishmania in them.

C M IV

KRASNIANSKI (M.) Traitement de la leishmaniose cutanée par les préparations de l'or [Treatment of Oriental Sore with Gold Preparations].—*Med Parasit & Parasitic Dis.* Moscow 1938 Vol. 5 No. 5. [In Russian pp 779-784 French summary p 784]

This paper appears to be a Russian version of the German paper already reviewed (this *Bulletin* 1937 Vol. 34 p 50) C M IV

LAVROV (A. P) & DUBOVSKOY (P. A) On Prophylactic Vaccination against Dermal Leishmaniasis.—*Med Parasit. & Parasitic Dis* Moscow 1938. Vol. 7 No. 2 [In Russian pp 228-232. English summary p. 233]

A German version of what appears to be the same paper has already been reviewed (this *Bulletin* 1937 Vol. 34 p 578) C M IV

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## LEPROSY

BALISA (Pedro L.) & BASOMBRIO (G.) Constatations et données sur la lèpre en Argentine d'après notre observation personnelle [Leprosy in Argentina.]—*Rev Brasileira Leprologia* S Paulo 1938 June. Vol 6 No 2. pp 91-111

This is a valuable account of the incidence of leprosy in Argentina.

An analysis of 862 cases observed by the authors in sixteen years showed the first symptoms to be cutaneous in three-fourths. Males formed 56.92 per cent. 15.84 per cent were imported cases. The age incidence was unusually high with only 11.03 per cent up to 20 years 26.63 per cent 20 to 30 years and 11.36 per cent over 60 years of age. In the coastal areas 83.59 per cent occurred among 67.49 per cent of the population, and in the very dry Andes area only 0.82 per cent among 8.31 per cent of the people and the authors point out that these data support the theory of ROGERS of the favouring influence of humidity. High intensity of population also favours the disease. Conjugal infections were rare and only bacillary positive cutaneous cases were thus communicated. The examination of contacts revealed 41 cases. The evolution of 236 cases was watched for some years and aggravation was noted in 18.64 per cent. a stationary condition in 16.10 per cent. improvement in 41.48 per cent. and clinical and bacteriological cure in 23.72 per cent. all in tuberculoid and nervous or maculo-anaesthetic cases. The authors advise search for ambulatory cases, treatment of mild and internment of advanced contagious ones

L Rogers

VAN BREUSEGHEM (R.) La lèpre chez les pygmées. [Leprosy in Pygmies.]—*Ann Soc Belge de Méd Trop* 1938. Mar 31 Vol. 18 No 1 pp 135-137

This is a brief note on leprosy among the pygmies of the Belgian Congo. The incidence was at the high rate of 6 to 9 per cent. Clinically the cases were macular except for one nodular and one mutilated case.

L R

MOISER (B.) Leprosy in Southern Rhodesia. Report of Ngomahuru Leprosy Hospital for 1937—*Leprosy Review* 1938 July Vol. 9 No 3 pp 110-113

This is the 1937 report of the Ngomahuru Leprosy Hospital and includes the data of three other Rhodesian institutions with 1 066 cases. Moogrol has been mainly rebel on out of 581 cases 25 died 42 became worse 53 remained stationary 363 improved and 98 were arrested and discharged, so that approximately 80 per cent. benefited from the treatment. Voluntary admissions continue to increase. The national institution in the native reserves of beer drinks are believed to be the main factor in spreading infections so leprosy patients should be excluded from them. The main colony with 8 400 acres and a good climate is considered suitable for the treatment of European patients if housing can be supplied.

L. R



LAMRIE (C. G.) The History of Leprosy—Vol. II Australia 1933.  
June 4 25th Year Vol. 1 No. 23. pp. 947-962. With 8 figs.  
[42 refs.]

This is a lengthy historical account of leprosy up to the middle ages. The decline in Europe since that period is discussed, and dietetic factors are considered to have played an important part. L. R.

DAVEY (T. F.) Leprosy in South Eastern Nigeria. Report on a Survey at Etiti Ama, Ekpoko, Bende Division, Owerri Province.—*Leprosy Review* 1933. July Vol. 9. No. 3. pp. 113-122.

This is a report on a leprosy survey of the Etiti Ama village in Nigeria.

For ten years the people have adopted a system of segregating lepers in special villages about half a mile from neighbouring ones, surrounded by a wall with a single entrance. The diet is mainly vegetarian. A survey has been made by the staff of the Urnuakoli leper colony during which everyone in the leper village was examined clinically and bacteriologically. The most interesting features were that of the population of the Etiti Ama village females outnumbered males and infants were very numerous. In spite of segregation 65 cases of leprosy or 3.7 per cent., remained in the village, and 41 more were in the leper village making a total of 6 per cent. Males numbered 37 and females 69 which is said to be characteristic of S. Nigeria. Adults suffered most, and the village cases were mostly mild, but the leper colony cases were mainly advanced cutaneous ones. L. R.

OBERDÖRFFER (Manfred) Untersuchungen ueber den Leprosfall in Südost Nigeria. [Leprosy in S.E. Nigeria.—Arch. f. Schiffs- u. Trop-Hyg. 1933. July Vol. 42. No. 7. pp. 310-321. With 2 figs.]

This paper also deals with the distribution of leprosy in S.E. Nigeria. The author has made surveys and found from 3 to 5 per cent. of the population to be infected. Mutilated cases formed 17 per cent., generalized infections of a severe type 30 per cent., and resistant cases 44 per cent. Few children and comparatively few women, 33 per cent., were affected. L. R.

OBERDÖRFFER (Manfred) Untersuchungen ueber die prädisponierenden Faktoren der Lepra in Süd-Nigeria. [Predisposing Factors of Leprosy in Nigeria.—Arch. f. Schiffs- u. Trop-Hyg. 1933. Aug. Vol. 42. No. 8. pp. 367-372. With 1 fig. [13 refs.]]

In this paper the author compares the monthly incidence of activity in leprosy cases with the dietary and climatic conditions. He finds most activity in November to March, when the rainfall and diurnal variations in temperature are lowest and the opposite conditions in April to October with the exception of August. He associates the high rates with the consumption of coco-nuts (*Collocasia antiquorum*) due he thinks, to toxic substances they contain. L. R.

LIVES (J. Ross). Leprosy Survey in the British Solomon Islands, Western Pacific. A Summarised Account of the Work and Results.—*Leprosy Review* 1933. July Vol. 9. No. 3. pp. 122-123. With 1 map.

This is a report of a systematic survey in the British Solomon Islands, Pacific Ocean, in which nearly a quarter of the 84 000 people

were examined. The number of leprosy cases found was 221 or 1.02 per cent and the total was computed at 900. The incidence was heavier in the bush than in the coast areas and the distribution that of a small group or family disease and heaviest among the more primitive people. The neural type predominated. The diet is deficient. Malaria and yaws are prevalent and predispose to leprosy. L R

PARMAKSON (P) *Statistic Reports on Leprosy in Estonia.—Internal Jl Leprosy* Manila. 1938 Apr-June. Vol. 6 No 2 pp 185-198 [18 refs.]

This is a statistical report on leprosy in the Baltic province of Estonia. It is best summarized in the author's own words—

We have brought forward data concerning the history and present status of the leprosy campaign in Estonia, and have given the total number of patients.

Cutaneous leprosy is more frequent than neural leprosy the proportion of which has decreased during the last thirty five years. This decrease has not been in all territorial areas where the cases originate from large old foci, the proportion of the neural type has been increasing, whereas it has been decreasing when they arise from small new foci or occur accidentally. Only a few cases of tuberculoid leprosy are known.

Leprosy has been much more common among women in Estonia than among men. During recent decades the proportion of female patients has been increasing continually. Together with this prevalence of the disease among females, we can see a marked decline in total incidence. We have no explanation for this sex incidence which is quite the reverse of that of other countries.

The time of onset of the disease has been investigated on 455 cases of the Kunda leprosarium. It has occurred in all ages, the highest frequency being in the 30-39 year group. For comparison there are given data from Saaremaa, where the disease begins at an earlier age. This earlier onset can be attributed to the fact that most cases in Saaremaa come from a limited and severely infected focus. It seems that age is not a decisive factor in the susceptibility to leprosy.

The patients have been isolated, on the average 8.8 years after the onset of the disease.

The average duration of the disease has been 15 years in 284 cases in which the time of death has been determined.

Of the cases of death, only 48.6 per cent. can be attributed to leprosy.

Of 455 patients, 19.3 per cent. recovered under treatment. 11.4 per cent. of the latter have shown a relapse. In 80 per cent. of these cases the relapse occurred more than five years after leaving the settlement.

Much attention has been paid to general treatment, and all of the more important antileprosy remedies of recent decades have been tried.

L R

LOWE (J) *Preliminary Report of an Epidemiological Survey of Leprosy in a Typical Rural Area of West Bengal.—Leprosy in India* 1938 Apr. Vol. 10 No 2 pp 41-49

A preliminary report on an epidemiological survey of 42 Bengal villages with a population of 10,000. The incidence of definite cases was 4.38 per cent. of which 82 per cent. were neural and 18 per cent. cutaneous in type. The age of onset indicated most infections early in life, and males showed twice the incidence of females and it was of a more severe type in the former. In over 80 per cent. there was a definite history of contact mostly with open cutaneous cases one-third

were infected by near and another third by distant relatives the latter due to the joint family system. The cases were more severe if contracted at an early age and through house contact L. R.

AYCOCK (W. Lloyd) & MCKINLEY (Earl B.) The Roles of Familial Susceptibility and Contagion in the Epidemiology of Leprosy.—*Internat. Jl. Leprosy* Manila 1938 Apr-June. Vol. 6 No 2 pp 169-184 With 3 figs. (1 map) [12 refs.]

This is an interesting discussion of the rôles of familial susceptibility and of contagion in the epidemiology of leprosy based on various data recorded in the literature of the subject. The authors agree that the absence of congenital transmission is against hereditary transmission, but they do not think contagion is the sole factor since the disease fails to spread to non-related persons equally exposed, so individual susceptibility may play a part. They admit in favour of contagion the frequent infection of children with the first lesions in skin areas that come into contact with their parents, but suggest that those who acquire leprosy may have inherited a susceptibility to the disease.

L. R.

MANALANG (Cristobal) Intergovernmental Conference of Far Eastern Countries on Rural Hygiene with Particular Reference to Leprosy.—*Jl Philippine Islands Med Assoc* 1938 Mar Vol. 18. No 3 pp 125-134

RAYMUNDO (Jose M.) Presidential Address.—*Monthly Bul. Bureau of Health* Manila 1938 Mar Vol 18 No 3 pp 93-99

MOISER (B.) Hospitalization in Leprosy.—*Internat. Jl Leprosy* Manila 1938 Apr-June Vol 6 No 2 pp 167-168.

DE SOUZA ARAUJO (H. C.) La Hype au Brésil et sa prophylaxie [Leprosy Prophylaxis in Brazil].—*Bruxelles-Méd* 1938. June 28 Vol 18 No 34 pp 1119-1124 With 1 map.

The author states that leprosy introduced into South America by European and negro slaves is irregularly distributed. The North has most with 4 per mille. At the end of 1937 32,884 cases had been counted and 11,835 isolated including 6,585 in São Paulo. Fifteen leproseries are open and fourteen under construction, and six institutions receive the children of patients. In three courses of instruction are given.

L. R.

LAMPE (P. H. J.) Typendifferentiatie van lepra'sydere in endemologische zin [Types of Leprosy considered Epidemiologically].—*Geneesk. Tijdschr. v. Nederl. Indië* 1938. Apr 19 Vol. 78 No 16 pp 890-904 With 10 figs. on 4 plates. English summary.

The chances of infection within and without the family group are discussed. Both the solitary leper and the first case in a family are examples of infection without the family which are considerably more numerous than intra-familial ones. In two village areas investigated the infectious outside the family formed about 80 per cent. of the cases.

and an inquiry at the Batavia Leprosy Institute gave a figure of 66 per cent. Only rarely were as many as three cases found in one family and this may be related to the potency of the source of infection.

L. R

COCHRANE (R. G.) & RAJAGOPALAN (G.) Preliminary Note on a Study of Childhood Leprosy at the Silver Jubilee Children's Clinic, Saldapet—*Leprosy in India* 1938 Apr Vol. 10 No 2. pp 54-61 With 2 figs

This further contribution to the subject is based on a careful survey of the population of the Madras municipality of Saldapet. A school survey of 1 671 children revealed 108 definite or suspected cases or 6 per cent. Of 206 cases in children in the municipality 91 were neural 63 tuberculoid 10 cutaneous and 40 with indefinite lesions. In the early periods of life distribution is about equal. Most cases developed between 6 and 13 years of age. In 50 per cent infection was traced to an open case and where more than one child was infected it was due to contact with a serious case.

L. R

RYRIE (Gordon A.) Acute Ulcerative or Sloughing Tuberculoid Leprosy—*Internal Jl Leprosy* Manila. 1938 Apr-June. Vol 6 No 2. pp 153-160 With 19 figs. (4 coloured) on 4 plates.

A case is described of acute ulcerative tuberculoid leprosy which is said only to have been met with in Malaya. It is essentially a rapid flare up going on to exfoliation and occasionally sloughing accompanied by low fever and leaves deformities. It is intractable unless large doses of hydnocarpus oil are given by local injections together with inunctions of hydnocarpus ointment to the ulcerated area. This gives striking results vindicating the use of hydnocarpus derivatives.

L. R

KEIL (Ernst) The Effect of Malaria on Leprosy and Filariasis.—*Internal Jl Leprosy* Manila 1938 Apr-June Vol 6 No 2. pp 161-165

The treatment of malarial complication in 38 lepers by atebria and plasmoquine was successful against the fever without influencing the leprosy condition.

L. R

WADE (H. W.) DE SIMON (D. S.) & FERNANDO (A. C.) The Skin Lesions of Neural Leprosy. V Observations in Ceylon.—*Internal Jl Leprosy* Manila. 1938 Apr-June Vol. 6 No 2. pp 199-222. With 30 figs. on 5 plates.

This is a further lengthy paper of the microscopical changes in nerve lesions. Major tuberculoid cases were few but minor ones fairly numerous and many of them regressive. Clinical differences and nerve involvement are related to the depth of the penetration of the lesions and the frequency of nerve infection decreases with less severity of the skin lesions. Activation of cases may be related to climatic conditions.

L. R.

RYNIE (Gordon A.) Pregnancy and Leprosy [Correspondence].—*Brit Med J* 1938. July 2. pp 39-40

This letter records from an experience of six hundred cases of pregnant lepers that the disease does not influence pregnancy but pregnancy has a most deleterious effect on leprosy for it results in a slow progressive spread of the disease during the later months, continuing long after delivery. Dr Rynie thinks mineral depletion is a cause for in his last twenty cases a diet with increased calcium intake tended to check the aggravation of the disease. The placenta and cord are free from lepra bacilli, and children removed at birth remain healthy. [These observations enhance the value of sterilizing leper husbands as successfully carried out by Dr Wilson in Korea.]

L. R.

TISSUUIL (J.) Contribution à l'étude de la réaction lépreuse. [Leprosy Reactions].—*Bull. Soc. Path. Exot.* 1938. June 8. Vol. 31 No. 6 pp 466-471

The author reports finding a polynuclear excess in reacting nodules together with 80 per cent. of them in the blood. Prolonged reactions have a bad prognosis.

L. R.

PLANTILLA (Fidel C.) Leprosy Manifestations. I The Early Lesions.—*Monthly Bull. Bureau of Health Manila* 1938 Jan. Vol. 18 No. 1 pp. 21-26

PLANTILLA (Fidel C.) Leprosy Manifestations. II Differential Diagnosis.—*Monthly Bull. Bureau of Health Manila* 1938 Mar. Vol. 18 No. 3 pp 77-81

PÄRTLPOEG (W.) Ueber Tagesschwankungen der Blutkörperchen senkungsgeschwindigkeit bei Lepraosen. [Daily Variations in Sedimentation Rate in Leprosy].—*Arch. f. Schiff- u. Trop. Hyg* 1938. June. Vol. 42. No. 6 pp. 253-259 [20 refs.]

The red corpuscle sedimentation rates at different hours of the day in untreated and treated cases are recorded. In patients in which treatment had been stopped for two months the maximum readings were at midday and the minimum ones in the early morning hours. Cases treated for two months with chaulmoogra preparations and carbonic acid snow showed a great decline in the midday maximum readings and a smaller one in the early morning minimum data.

L. R.

SOREL (F. P. J.) Prophylaxie de la lèpre dans les colonies françaises. [Prophylaxis of Leprosy in the French Colonies].—*Bull. Office Internat. d'Hyg. Publique* 1938 June. Vol. 30. Supp. to No. 6. 21 pp. With 43 figs. on 23 plates.

This lengthy paper gives full information regarding the campaign against leprosy in French possessions. It contains nothing of importance that is new. [See this *Bulletin* 1937 Vol. 34 pp. 302, 303 and 905.]

L. R.

FAURE BEAULIEU (M) & BRUN (G) Les formes granulaires du virus lépreux dans les lésions hanséniennes leur mutation *in situ* en formes bacillaires. [Granular Leprosy Bacilli.]—*C R Soc Biol* 1938. Vol. 127 No 14 pp 1437-1440

The authors report finding in stained sections of leprosy lesions showing no lepra bacilli by ordinary examination granular acid resistant forms which they regard as a stage in the evolution of the organism. Some of them present a cyanophilic state. They also claim to have cultivated the organism and found mutation between the forms  
L R

SAENZ (A) Sur les caractères d'un bacille acido-résistant isolé par F Lleras du sang de malades atteints de lèpre. [Bacillus of Lleras Isolated from the Blood of Lepers.]—*Bull Acad Méd* 1938 May 24 102nd Year 3rd Ser Vol. 119 No 20 pp 579-583

The author reports on a study of the acid fast bacillus cultivated from leprosy patients blood by Lleras. He obtained an identical bacillus from tap water and both on injection intradermally produced the same reactions as those produced by other paratuberculous saprophytes.  
L R

MANALANG (J) Non-Acid-Fast Forms of *My leprae* in Leprotic Lesions Preliminary Report.—*Jl Philippine Islands Med Assoc* 1938 Mar Vol. 18 No 3 pp 135-140 [12 refs.]  
— Removal of Acid-Fastness from *My leprae* Further Observations.—*Ibid* Vol. 18 No 4 pp 205-209 [13 refs.]

In these two papers the author reports on the presence of non acid fast bacilli in leprosy lesions and in portions of inguinal glands of lepers under different conditions.

In the first paper he reports the frequent finding of non acid fast forms of *Myco leprae* in both treated and untreated lesions by three methods of staining for the details of which the original should be consulted. He also found them at times in clinically active lesions in the absence of typical acid fast bacilli so regards them as a stage of the organism, either young or degenerating forms. They were much fewer in locally treated lesions than in lymph glands. From previous *in vitro* experiments he finds that antileprotic drugs had an injurious effect on acid fastness of the bacilli and that the non-acid fast are probably degenerating forms.

In the second paper he reports that in lymph nodules kept *in vitro* with either iodized *nigella* esters or the pure oil the acid fast bacilli become largely changed into non-acid fast, and that this change is greater when the drugs are applied intermittently than continuously. He suggests that this explains the greater efficiency of intermittent intradermal injections of the hydnocarpus preparations. The *in vitro* changes were obtained in both boiled and unboiled lymph gland tissue. In *in vitro* treated tissues non-acid fast bacilli are rare probably because they are degenerate forms that become absorbed from the tissues.  
L. R.

DHARMENDRA & LOWE (John) Attempts to cultivate *M. leprae* muris — *Indian J. Med Res* 1938. Apr. Vol. 25 No. 4 pp. 835-842. [20 refs.]

The authors report negative attempts to cultivate the rat leprosy bacillus, including the use of McKinley's method. [See this *Bulletin* 1932, Vol. 29 p. 549 1933 Vol. 30 pp. 238 559 1934 Vol. 31 p. 265] L. R.

TISSEUIL (J.) Essai d'inoculation de la lèpre humaine au rat d'élevage par injections quotidiennes pendant un mois [Inoculation Experiments.]—*Bull. Soc. Path. Exot.* 1938. Apr. 6 Vol. 31 No. 4 pp. 277-279

In this note the author reports the results of thirty successive daily injections of human leprosy material into rats. All had died or were killed by the end of nine months, but only local reactions were found, with no trace of infection. L. R.

WATAMABE (Yoshimasa) Experimental Studies on Animals concerning Leprosy Report IX. Inoculation Tests with Human Leprosy Part 2.—*Kiassato Arch. Exptl. Med.* 1938. Apr. Vol. 15. No. 2. pp. 179-186 With 8 figs (4 coloured) on 2 plates.

This worker had previously obtained small rapidly absorbed nodules at the sites of the inoculation of human leprosy nodules into small animals. He has now repeated the experiments whereby TAKAGI claimed to have produced infection in this way after a preliminary treatment with venom, but obtained negative results. He found, however that subtransplantations of the granulating tissues produced by leprosy injections into rats could be effected up to a third but not to a fourth passage. The axillary glands were also affected but only very rarely the spleen or liver and the lesions were pseudotuberculous in nature rather than true leprosy granulating tissue. L. R.

ADLER (S.) & ASHRAEL (Rivkah) Experimental Human Leprosy in the Hamster Resistance of Leprosy Bacilli to Drying and to Chaulmoogra. [Demonstration.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. June 25. Vol. 32. No. 1 pp. 4-6.

This is a brief account of a demonstration of specimens to illustrate the resistance of leprosy bacilli in thin sections of tissues to as long as seven days desiccation over sulphuric acid, after which they could still infect hamsters. L. R.

BEAUDIMENT (R.) & TIVOLLIER (M.) Destruction des bacilles de la lèpre déposés sur les linges et les instruments. [Destruction of Leprosy Bacilli in Rags and Instruments.]—*Bull. Soc. Path. Exot.* 1938. May 11 Vol. 31 No. 5 pp. 352-357

MARCHOUX has shown that ordinary disinfection methods, including boiling, failed to free instruments from leprosy bacilli alive or dead so fallacies could arise. The authors have tested various methods of doing so and recommend the use of 1 to 2 per cent. of soda for the purpose. Little is said regarding rags in the article except that disinfectants adequate to destroy the bacilli on instruments are liable to disintegrate fabrics. L. R.

**RADNA (R.)** Note sur la réaction de Mitsuda chez des sujets indemnes de lèpre. De l'influence du traitement de la lèpre sur la bacillémie lépreuse et sur les résultats de la réaction de Mitsuda [Mitsuda's Reaction].—*Ann Soc Belge de Méd Trop* 1938. Mar 31 Vol 18 No 1 pp 63-72.

The author reports similar results to those of previous workers from the use of Mitsuda's reaction, namely negative reactions in active cutaneous cases and positive ones in nerve and recovering cases. Its appearance in a previously negative case is of good prognostic import [see this *Bulletin* 1935 Vol. 32 p 341] L R

**RABELLO Jr & PINTO (T)** Interêt de la séro-réaction de Witebsky, Klimgenstein et Kuhn pour la connaissance des formes de la lèpre. [Witebsky Reactions].—*Bull Soc. Path Exot* 1938. May 11 Vol. 31 No 5 pp 339-341

The authors report observations on the use in leprosy of the Witebsky Klimgenstein and Kuhn complement fixation test with a tuberculin antigen. They found it positive in 68 and 60 per cent respectively of tropho-neurotic and of macular cases, and negative in 70 per cent. with cutaneous lesions that is just the opposite to the Mitsuda leprolin test. L R.

**DE ALMEIDA (O) & DE MOURA COSTA (H.)** Traitement de la lèpre par les hautes pressions d'oxygène associées au bleu de méthylène. [Oxygen under Pressure and Methylene Blue in the Treatment of Leprosy].—*Bull Soc Path Exot* 1938. May 11 Vol. 31 No 5 pp 346-351 With 1 fig

This is an interesting account of combining methylene blue injections with oxygen under pressure. It is based on the finding that man can resist an atmosphere with an oxygen pressure of 2.5 to 4 atmospheres but anaerobic organisms in particular cease to develop under an oxygen pressure of 4 to 5 mm. of mercury. In 1937 OSARIO and RABELLO reported clinical improvement and degeneration of the lepra bacilli in the tissues following submitting leprosy patients to oxygen pressure.

Three injections intravenously of 5 to 10 cc. of methylene blue are first given, and when the drug ceases to be excreted in the urine the patients are submitted to the action of oxygen in a metal case similar to that used in cancer. The immediate results are congestion and slight oedema of the cutaneous lesions and a furunculoid appearance of nodules, which may go on to suppuration in a day or two. No general symptoms appear except occasionally slight fever and some pain. Clinical improvement rapidly ensues, with diminution of infiltrations and nodules, and progresses in stages in some cases to the nearly complete disappearance of the lesions. Equally striking was rapid change from abundant typical lepra bacilli in the tissues to profound alterations of their morphology and granular changes followed by great diminution in their numbers up to complete disappearance in some cases. In six cases they noted a change from negative to positive leprolin reactions and alterations of its degree in three more. Microscopically retrogressive changes are well marked. The oxygen was applied at a mean pressure of 2.5 to 3.5 atmospheres in two to three applications for a total of 3½ to 15 hours and the cases



observed over a period of 4 to 6 months. The results were thus very remarkable and promising. [Equally good or better results might ensue from combining the oxygen pressure treatment with the use of the chanimoogra preparations.] L. R.

TISSEUIL (J) GUILHAUMOU (F) & RIVOALEN (P) Étude comparée de l'action thérapeutique des huiles neutres d'arachides et de chanimoogra utilisées en injection intradermique. [Comparison between the Activities of Ground-nut Oil and Chanimoogra Intradermally Administered.]—*Bull Soc. Path Exot* 1938. July 6. Vol. 31 No 7 pp 585-587

The authors report on comparative trials of chanimoogra and Sudan ground nut oils intradermally in leprosy. They found the former to have a rapid favourable action, and the latter to have only a feeble one of short duration. L. R.

TISSEUIL (J) & RIVOALEN (P) Action du beurre de Goril par voie intradermique dans les lèpres tuberculoides. [Goril Butter Intradermally in Tuberculoid Leprosy]—*Bull Soc. Path Exot* 1938. July 6. Vol. 31 No 7 pp 591-592.

The authors report a trial in two tuberculoid cases of intradermal injections of Goril butter (which contains chanimoogric acid) 40 per cent. in olive oil, warmed to facilitate injection. They record a slow improvement in the cases. L. R.

LABERKADIE (V) & GUICHARD (F) Au sujet de la neutralisation des huiles d'hydnocarpus en vue du traitement de la lèpre (Conséquences chimiques.) [Neutralisation of Hydnocarpus Oil for Treatment of Leprosy]—*Rev Méd Française d'Extrême-Orient* 1938. Feb Vol. 16. No 2. pp. 120-122.

This is a technical paper in which the authors conclude that the neutralization of hydnocarpus oil by the procedure of LE NAOUR and ROUBAUD yields a product free from glycerine and containing little active glyceride. L. R.

BOSS (D N) Effects of Treatment of Trophic Ulcer of the Sole of the Foot in Leprosy by Injections of Hydnocarpus Preparations.—*Leprosy in India* 1938. Apr Vol 10. No 2. p 70. With 4 figs. on 1 plate

The author reports cases, with photographs [poorly reproduced] before and after treatment, successfully treated by weekly local injections of creosoted hydnocarpus oil, as advised by LOWE and CHATTERJI. L. R.

DE (N K) Studies of the Factors affecting Oxidation of Hydnocarpus Oil.—*Leprosy in India* 1938 July Vol 10 No 3 pp. 76-82

The authors report on a study of methods to prevent or remove the irritating oxidation of hydnocarpus oil. They advise careful selection

of the seeds to be used fresh the prevention of contamination during expression with water and foreign matter filtration and subsequent storage in full bottles without exposure to air and light  
L. R.

DORNER (Alfred) Zur Kenntnis des Chaulmoograables und einiger daraus hergestellter Präparate. [Chaulmoogra Preparations.]—*Deut. Med. Woch.* 1938 Aug 28 Vol. 64 No 35 p 1257  
This brief paper deals with the preparation of chaulmoogrates and antileprol on the usual lines.

TISSEUIL (J) Contribution à l'étude du traitement de la réaction lépreuse. [Treatment of Leprosy Reactions.]—*Bull. Soc. Path. Exot.* 1938 June 8. Vol. 31 No 6 pp 465-468.  
The reactions occurring after intravenous injections of methylene blue are discussed. The author concludes that intravenous injections of 0.1 per cent. of the dye with 4 per cent. glucose and 0.4 to 0.9 per cent. sodium chloride are beneficial in arresting the reactions relieving the pains causing the oedema to disappear and the new lesions to be absorbed. If however fever with increasing weakness persist the injections should be stopped for a time.

BADGER (L. F.) & PATRICK (D. W.) Effects of Intramuscular Injections of Vitamin B<sub>1</sub> on Acute Leprous Neuritis and of Oral Administration on the General Disease. A Preliminary Report.—*Public Health Rep.* 1938. June 17 Vol. 53 No 24 pp 969-978  
L. R.

BARÉ (J) Sur le traitement de la lèpre par les injections intraveineuses d'huile de chaulmoogra neutralisée. [Chaulmoogra Intravenously in Leprosy.]—*Bull. Soc. Path. Exot.* 1938 May 11 Vol. 31 No 5 pp 341-345  
This note reports three cases of leprosy treated for six months with intravenous injections of neutralized chaulmoogra oil with improvement.  
L. R.

RADNA (R.) Sur le traitement des algies lépreuses par le cobranyl. [Treatment of Leprosy Pains by Cobranyl.]—*Ann. Soc. Belge de Méd. Trop.* 1938. Mar 31 Vol. 18. No 1 pp 73-74  
The author reports uniform relief in 21 cases of leprosy pain following the weekly injection of cobra venom in 0.02 to 0.1 mgm. doses of Meunier's cobranyl.  
L. R.

GASS (H. H.) Cobra Venom in Leprous Neuritis.—*Leprosy in India* 1938 Apr Vol. 10 No 2. pp 37-40  
The author reports on the use of cobra venom in 35 cases of leprosy neuritis with marked improvement in 17 considerable improvement in 15 slight in 2, and none in 1  
L. R.

MARCHOUX (E.) & CHORINE (V) La muqueuse rectale est perméable au bacille de Stefansky [Permeability of the Rectal Mucosa to Rat Leprosy Bacilli].—*Bull Soc Path Exot.* 1933. June 8. Vol. 31 No 6 pp. 462-464

These workers report successful experiments in transmitting the infection of rat leprosy by careful instillation of emulsions containing Stefansky's bacillus into the rectum of rodents. The mesenteric glands showed the bacilli.  
L. R.

MARCHOUX (E.) & CHORINE (V) Perméabilité de la muqueuse buccale du rat au bacille de Stefansky [Permeability of the Buccal Mucous Membrane to Rat Leprosy Bacilli].—*Bull. Soc. Path Exot* 1933. July 6. Vol. 31 No. 7 pp. 580-582.

Infection through the buccal mucous membrane, with precautions to prevent any flow down the oesophagus, resulted in one of five rats developing clear infection of the submaxillary glands alone 17 months later although another showed no infection after seven months, so the incubation period was long.  
L. R.

CHORINE (V) & BERRY (P) Note sur quelques essais infructueux de traitement de la lèpre murine [Unsuccessful Attempts at treating Rat Leprosy].—*Bull Soc Path Exot.* 1933. July 6 Vol. 31 No 7 pp 588-591

The authors report negative results in rat leprosy from the administration of selenium, cerium, tungsten, aluminium and sulphate of vanadium.  
L. R.

PAPAIOANNOU (A.) Recherches sur la culture et la transmission expérimentale à des animaux de laboratoire du bacille lépreux humain et du bacille de Stefansky [Cultivation and Transmission of Human and Rat Leprosy Bacilli].—*Bull. Soc Path Exot* 1933 July 6 Vol. 31 No. 7 pp 582-585.

The author reports having macerated for fifteen days in normal saline human leprosy nodule emulsions, and for the same time those of rat leprosy in glycerine and claims subsequently to have cultivated both forms of bacilli in a medium resembling lymph in composition, and also to have infected rats, mice and spermophiles with the human cultures, and rats with Stefansky's bacillus.  
L. R.

## MALARIA

ILLETARI (Alessandro) Maurizio Ascoli's Treatment in the Practice of a Malaria Control Station.—*J. Trop Med & Hyg* 1938 May 16 & June 1 Vol. 41 Nos. 10 & 11 pp 168-170 177-181 [65 refs.]

The author has treated 70 cases of malaria by Ascoli's method and gives details of 20 of these cases. His experience confirms the very numerous published reports as to the great value of the treatment. Its value lies not only in its remarkable effect on splenomegaly still more marked is the great improvement in the patient's general condition. The author believes that the treatment increases the patient's resistance to the malaria parasite. Certain of the patients treated have remained for months free from further attacks of malaria though living in malarious localities. The treatment should only be used by a skilled staff  
Norman White

MOSNA (Ezio) Sulla cura di Maurizio Ascoli nella infezione malarica cronica. [Treatment of Chronic Malaria by Ascoli's Method.]—*Riv di Malariologia* Sez. I 1938. Vol. 17 No. 2. pp 128-130 With 1 plate. English summary (5 lines)

This is a record of the treatment of nine cases of chronic malarial splenomegaly by Ascoli's method. All received from 20 to 30 intra venous injections of adrenalin in the usual doses of from 1/100 to 1/10 mgm. In one case the maximum dose was increased to 1/7 mgm. In all cases the results were good. There was rapid improvement of the patients' general condition, cessation of splenic pain, and reduction in the size of the spleen, which was very marked in some cases. This reduction of the splenic volume persisted for eight months in three cases a still further diminution of the spleen followed the cessation of treatment  
N II

GRASSI (Gaetano) Note di un medico coloniale sulla cura di Maurizio Ascoli. [Colonial Doctor's Experience of Ascoli's Method of Treatment.]—*Policlinico* Sez. Prat. 1938 July 4 Vol. 45 No. 27 pp 1271-1273

The author relates his experience of Ascoli's method of treatment of malaria and writes enthusiastically of its value.  
N IV

BELL (D) Malarial Splenomegaly Treatment by Ascoli Therapy—*East African Med J* 1938. May Vol. 15 No. 2. p 51

Six cases of malarial splenomegaly in Kiambu were treated by Ascoli's method. The size of the spleens in these cases varied from 4 fingers breadth below the costal margin to four inches below the umbilicus. In all cases after 20 days' treatment the spleen receded to the costal margin. Splenic pain ceased after three days. The red cell count rose rapidly but not the haemoglobin.  
N IV

SIXTON (J. A.) Action of Atabrin upon the Gametocytes (Crescents) of *Plasmodium falciparum* [Demonstration.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1933 June 23 Vol. 32 No. 1 pp. 11-12.

"Atabrin is known to produce morphological changes in both the sexual and the asexual forms of *P. vivax* and *P. malariae* and also in the asexual forms of *P. falciparum*. On the other hand, it is reported by many workers to have no action upon the gametocytes of the last parasite. When the drug is given to a patient showing mature crescents in the peripheral blood, these forms are apparently unchanged and are still capable of causing transmissible infection in mosquitoes.

"Some observations made at Horton during the past year have shown that atabrin is not without effect upon the crescents of the Roumanian strain of *P. falciparum* used there for malaria therapy. If the drug be administered before these forms are detected in the peripheral blood, it appears to cause morphological changes in the immature stages of the sexual forms. When the crescents appeared the following changes were noted—

"(a) The majority of the gametocytes first seen showed the pigment aggregated into a single, solid mass. Very many appeared to be immature. Some forms apparently normal also occurred, but others showed signs of commencing clumping of the pigment.

"(b) Within the next day or so the forms with large pigment blocks become relatively scanty, their place being taken by crescents showing either (i) very scanty pigment grouped as a few jet black blocks or granules or (ii) a complete absence of pigment.

These forms resemble haemogregarines very closely. In many of them the chromatin appears to be normal, while in a few it looks atypical, suggesting serious damage by the drug.

"(c) During the following days the number of pigmentless crescents tends to diminish, while those with scanty pigment increase in relative frequency.

"(d) In smears from the spleen of a patient who died of pneumonia 2 days after completing a full course of atabrin treatment, a very large number of apparently mature gametocytes were found. A few appeared to be quite normal, some had the pigment clumped into a large mass, and many showed scanty pigment or were pigmentless. Some of the pigment-free forms had a large block of extracellular pigment attached to one pole. This looked as if it had just been extruded from the crescent.

These findings are evidence that atabrin causes clumping of the pigment in immature gametocytes, and that the absence of pigment in some forms is probably due to the extrusion of this substance rather than to any failure of the parasite to produce it. One would expect that parasites from which the pigment had been extruded, might be seriously damaged yet mosquitoes fed on patients showing very large numbers of atabrin-affected forms developed heavy infections. As it was possible that the mosquito infection was derived from some apparently normal gametocytes still present, further investigations were carried out which showed—

"(e) *Formation of Gametes*—(i) Female gametocytes round up prior to fertilization, although devoid of pigment, and (ii) male gametocytes without pigment or with only a few grains, seem to enflagellate normally.

"(f) *Fertilization*—Female gametes with large blocks of pigment seem to attract microgametes in the same manner as do normal macrogametes.

"(g) *Oocysts*—Vermiculae with little or no pigment could be found in smears of the gut contents of mosquitoes fed 25 hours previously on a suitable patient.

"(h) *Oocysts*—The number of oocysts which developed appeared to be out of proportion to the number of normal gametocytes. Most forms observed on the 6th day showed scanty pigment collected into small blocks, an appearance very different from the abundant, more discrete,

scattered pigment granules seen in normal oöcyts at this stage. In normal oöcyts about 9 days old, it is difficult to find forms without detectable pigment, while pigment was very rarely found in atebirin cases.

These findings appear to show that many gametocytes with little or no pigment are still capable of undergoing their development in the insect host.

THOMSON (Jean) A Case of Possible Atebrin Toxaemia with Reference to Published Articles.—*Jl Assoc Med Women in India* 1938. May Vol. 26 No 2. pp 34-37

This paper contains the description of a case of malignant tertian malaria in a woman in the ninth month of pregnancy. She was treated with atebirin 0.1 gm. three times a day. After she had received 0.8 gm. in all, symptoms of liver damage developed, jaundice, very scanty urine, albuminuria and drowsiness amounting to semi-consciousness. She recovered under appropriate treatment and the use of quinine. [There is but little evidence that atebirin was responsible for the condition.] N IV

DOMÍNGUEZ CALÁN (José M.) La asociación medicamentosa atebirina-plasmoquina como medio curativo de la infección palúdica en campañas de lucha antipalúdica. [The Value of Atebrin associated with Plasmoquine in the Cure of Malaria].—*Riv di Malariaologia* Sez. I 1938 Vol. 17 No 2. pp 111-121 With 1 fig

The author reports his experience with atebirin and plasmoquine in the treatment of cases of malarial infection with special reference to the prevention of relapse, and contrasts the results with those obtained by him with quinine in a large series of cases. Seventeen cases were treated with atebirin 0.3 gm. a day for 7 days followed, after an interval of 3 days, by plasmoquine 0.03 gm. a day for 5 days. The relapse rate was 1.20 per cent. Ninety-seven cases were treated with atebirin for 5 days and plasmoquine for 5 days in the same doses as before. The relapse rate was 1.11 per cent. Thirty-six cases were treated with atebirin for 5 days and plasmoquine for 7 days. There were no relapses. The relapse rate of 2,712 cases treated with quinine for 20 days 1.0 gm. a day for adults was 59.58 per cent. N IV

NUCCIOTTI (Lionello) Ricerche sulla terapia adrenalinica nella malaria estivo-autunnale primitiva. [Adrenalin Therapy in Primary Attacks of *Falciparum* Malaria].—*Riv di Malariaologia* Sez. I 1938. Vol. 17 No 2. pp 131-136 With 2 graphs. German summary (6 lines)

The observations recorded in this paper were designed to test the influence of adrenalin therapy administered immediately after the cessation of the primary attack in primary malignant tertian infections on febrile and paroxysmal relapses and on the gametocytes of *Pl. falciparum*. The observations were made in East Africa where according to Italian observers, the strain of *falciparum* commonly met with is dissimilar in certain respects from Italian strains of that parasite. The designation *immaculatum* has been given to the African strain in question. Prolonged observation has led the author to believe that from the point of view of relapse production following primary

infections the Italian and *immaculatum* strains of *falciparum* are strictly comparable.

In ten cases the primary attack was treated with quinine. As soon as the temperature had fallen to normal a series of twelve intravenous injections of adrenalin was given on twelve successive days. The dose given in each of the first six injections was 1/20 mgm. in the last six it was 1/10 mgm. The patients were kept under observation from 35 to 38 days. Only three of the ten suffered any febrile relapse during this period. Parasite relapses were much more frequently observed ring forms were commonly seen in the blood of patients with normal temperatures.

Six other patients harbouring crescents in the peripheral blood were submitted to exactly similar treatment as the first group. The blood was examined daily throughout the adrenalin treatment and during the following five days. Adrenalin did not have the least influence on the production of crescents—they persisted in the blood in all six cases.

A IV

RAYMOND-HAMET Sur l'activité de l'arsine alcaloïde découvert en 1829 par Pelletier et Coriol et non encore étudié physiologiquement. [The Action of Arsine, an Alkaloid (of Cinchona).]—*Bull Acad Med.* 1838. July 5. 102nd Year 3rd Ser Vol. 120 No 26 pp. 35-42 With 6 figs. [12 refs.]

In 1829 questions arose regarding the quality of quinine or the "bark" coming from certain parts of Peru. Some of those who used it said that the cortex contained no quinine. PELLETIER was instructed to undertake analysis of it, and with his colleague, CORIOL, examined specimens of the cortex sent from Arica—a port on the coast of Peru. They reported that this bark contained no quinine but a new alkaloid which they named *arsine* from its place of origin. Upon this report introduction of bark from this source ceased and in 1873 Hesse expressed doubt as to the existence of any such alkaloid. Four years later however he had an opportunity of analysing more samples and found *arsine* present in a proportion of 0.62 per cent.

More recently in 1890 MOISSAN and LANDRIU extracted 3.35 per cent. of *arsine* from specimens of Cinchona bark.

The author gives in this article a detailed account of its physiological action on the circulation—it lowers arterial pressure. [There is no published account so far as the reviewer is aware, of this alkaloid being tried in the treatment of malaria.]

H H S

MOITZHELDT (Ketil) Sulfanilamid ved malaria. [Sulphanilamide in Malaria].—*Norsk Mag f Lægevidenskaben* 1938. Aug Vol. 99 No 8 pp 872-874 With 3 figs.

A man aged 41 was treated with malaria for his general paralysis. The administration of 1 gramme of prosectasine three times a day promptly cured the malaria which did not recur during a five months' observation period. Another patient aged 33 had suffered from malaria in Africa three years earlier and had also been inoculated with it for his cerebrospinal syphilis. The administration of prosectasine (1 gramme three times a day) was promptly effective, and when the malaria recurred two weeks later it disappeared under the same treatment. In his review of the recent literature of the subject,

Motzfeldt points out that all the three principal forms of malaria appear to be equally amenable to treatment with sulphanilamide. He is however reserved in his opinions as to the prospects of this drug becoming a universally accepted specific against malaria.

C Lillington

COGGESHALL (Lowell T) Prophylactic and Therapeutic Effect of Sulfonamide Compounds in Experimental Malaria.—*Proc Soc Experim Biol & Med* 1938. June Vol.38. No 5 pp 768-773

The effect of sulphonamide and sulphonyl-sulphanilate has been tested on controlled experimental malaria infections by *P. knowlesi* in *rhesus* monkeys. Both drugs were given intraperitoneally and the former by mouth as well.

Following intraperitoneal inoculation of 1 million parasites into a test monkey which was simultaneously given 0.25 gm. sulphanilamide by the same route and for four consecutive days infection failed to develop while the control animal died. A similar experiment in which drug treatment was delayed till parasites appeared in the blood 0.75 gm. sulphanilamide being given in all resulted in a chronic low grade infection in one animal the control dying within the normal period. The latter experiment repeated on four test animals with administration of drug at different intervals after inoculation either prevented appearance of parasites in the blood or caused them to disappear on treatment. The parasites were moreover distorted and broken. In prophylactic experiments in which the same drug was given to some animals intraperitoneally and to others by mouth on four consecutive days before inoculation with infected material either infection did not result or the appearance of parasites was delayed. Infected blood incubated with the drug for 30 minutes at 37°C. failed to produce infection in normal monkeys.

Sulphonyl-sulphanilate has some therapeutic value if given early in the disease but no prophylactic value and *in vitro* the drug has little or no effect on the parasite.

Experiments in which chronically infected monkeys were treated with these drugs for six consecutive days showed that the blood of animals receiving sulphanilamide was not infectious to fresh monkeys whereas the blood of those receiving the other drug was. Neither drug has prophylactic or therapeutic value in *P. cathemerium* infections of canaries or in *P. lophurae* infections of young chicks.

J D Fulton

REY (Fernando) Malariabehandlung mit Atepe-Tabletten (Atebrin compositum) [Treatment of Malaria with Atepe Tablets (Atebrin Compositum)]—*Arch f Schiffs u Trop Hyg* 1938 July Vol. 42. No 7 pp 305-307

Local conditions in the lower Guadalquivir basin an endemic focus of malaria, induced the author to attack the problem by drug treatment, with a view to sterilization of carriers. At the start patients received treatment with quinoplasmoquine but circumstances caused a switch over to Atepe tablets—each of which contains 0.1 gm. atebrin + 0.005 gm. plasmoquine. The drug was given on



five consecutive days, and in severe cases on seven days, in one daily dose without regard to time of day or interval from meals, on account of the large number to be treated. The daily dosage was as follows —

Infants	$\frac{1}{2}$ tablet
1-3 years	$\frac{1}{2}$ -1
3-5 "	1-1 $\frac{1}{2}$ "
6-10 "	1 $\frac{1}{2}$ -2 $\frac{1}{2}$ "
Over 10 years	3

These doses were well tolerated and no toxic symptoms noted except a slight abdominal pain in two cases, avoided by giving the dose at three different times. A slight yellow colouring of the skin which slowly disappeared, was frequent at the end of treatment. Over a period of 8 months in 698 treated cases there was a relapse rate of 12 per cent. in benign tertian malaria. The author concludes that the drug is valuable avoiding long periods of treatment and making control easier. Secondary symptoms are absent and the relapse rate is small. The method of administration and dosage requires further study  
J D Fallon

MAYER (Martin) *Neuere Erkenntnisse zur Behandlung und Prophylaxe der Malaria* [Modern Knowledge on the Treatment and Prophylaxis of Malaria.]—*Schweiz Med. Woch.* 1938 July 30 Vol. 68 No. 31 pp 805-808

DECOURT (Ph.) *La lutte antiplasmodiale. Ses bases épidémiologiques et sociales. Ses directives générales.* [Epidemiological and Social Bases of, and General Directives for Measures against the Malaria Parasite.]—*Bull. Soc. Path. Exot.* 1938. Apr. 6. Vol. 31 No. 4 pp 306-314

This attempt to establish a doctrine which should inspire anti plasmodial measures is not easy to summarize. It contains nothing very original except in the manner of presentation. The increase of virulence of strains of plasmodia dependent upon rapid transmission from subject to subject is discussed. The "limit of benignity" is the degree of malaria infestation above which pernicious and fatal forms of the disease begin to appear. This rate, the limit of benignity varies with numerous factors such as malnutrition, meteorological conditions and the degree of immunity of the population. Among a population with a low degree of immunity the rate corresponds to a parasite rate of about 30 per cent. It should be the aim of the hygienist to keep the parasite rate well below the limit. In most malarious regions there are "virulent areas" in which the disease is more prevalent than elsewhere. They maintain specially dangerous strains of parasites, conserve active malaria during a large part of inter-epidemic periods and determine in large part the malaria of surrounding districts. The treatment of these "virulent centres" is one of the chief points of antiplasmodial measures.

Antiplasmodial measures should include specific chemoprophylaxis for "virulent centres" limited specific chemoprophylaxis for areas of moderate endemicity limited to certain groups of the population and to certain short periods of the year sanitary barrages the search for and the treatment of cases, and hygienic prophylaxis. A W

CIUCA (M) BALTEANU (I) & ALEXA (I) with the collaboration of R BALTEANU V BOERIU & A RADIANOV *Expériences d'assainissement à l'aide de médicaments synthétiques. [Experimental Control of Malaria with Synthetic Drugs.]—Arch Roumaines Path Experim et Microbiol* 1937 Sept Vol 10 No 3 pp 295-306 With 2 graphs.

This is a very well documented report on an interesting experiment. In the absence of all other anti malarial measures an attempt was made to control malaria by means of the administration of atebryn and plasmoquine. A village Opriseni of 136 houses with 725 inhabitants was selected for the experiment. A resident doctor and nine sanitary assistants were in charge of the work. The original plan was to submit every inhabitant to a five-day course of atebryn 0.30 gm. a day for adults. Thereafter throughout the epidemic season everyone was to receive 0.02 gm. plasmoquine twice a week and 0.20 gm. atebryn once a week. In spite of every endeavour only 651 persons of the 725 were induced to take the treatment. Of these 530 took it very regularly and followed it to the end. Thirty-one children below two years of age vomited soon after taking atebryn. This necessitated the cessation of treatment in certain cases. Atebryn taken on an empty stomach was the cause of discomfort. The experiment began on the 1st May 1935 when the splenic index of children less than 14 years of age was 8.92 the splenometric index 14.54 and the parasite index 3.68. In November 1935 at the end of the experiment these indices were 3.26 4.34 and 0.48. In the two following years measures were limited to the treatment of cases as they occurred with atebryn and plasmoquine. In November 1937 two years after the completion of the experiment, the splenic splenometric and parasite indices were 2.79 3.71 and 0.75 still considerably lower than they were before the experiment.

During the experiment 1.3 per cent. of the treated suffered from malaria as compared with 6.1 per cent. of the untreated or irregularly treated.

In spite of the efforts of the large staff it was only possible to apply the plan to 73 per cent. of the population. Without close supervision, which must be of necessity costly, striking results can hardly be expected. The method of control is thus of limited applicability.

N IV

WATSON (Malcolm) *Some Points in the Technique of the Prevention of Malaria.—Jl Ceylon Branch Brit Med Assoc* 1938 Mar Vol. 35 No. 2, pp 178-185 [11 refs.]

RODHAIN (J) *Schizogonie sans pigment chez les pingouins infectés de Plasmodium praecox (relictum) [Non-pigmented Schizonts in Penguins Infected with P. praecox]—C R Soc Biol* 1938. Vol. 127 No. 4 pp 368-372. With 3 figs.

In this paper the author describes a malarial infection in four penguins (*Spheniscus demersus*) which died in the zoological gardens in Antwerp. In three cases associated with an infection of the red blood cells there were fairly numerous endothelial non pigmented schizonts in the various organs. In one case however there were numerous endothelial schizonts in the organs while only a single parasite

was found in a red cell. The infection of one penguin was established in canaries which however showed only parasites of the *Plasmodium praecox* type in the red cells and no endothelial schizonts. The author favours the view that the presence of endothelial schizonts in the penguins was due to infection having resulted from mosquito bites and not from blood inoculation as was the case with the canaries. He thinks the evidence points to the endothelial schizonts, which occur not only in the fixed endothelial cells but also in the monocytes and histiocytes of the blood being derived directly from the sporozoites.

C M Wemyss.

CHOPRA (R. N.) & DAS GUPTA (B. M.) A Note on the Therapeutic Efficiency of Solsseptasine in Simian Malaria (*P. knowlesi*)—*Indian Med Gaz* 1938 July Vol. 73 No. 7 pp. 365-366. With 1 chart.

The authors have employed solsseptasine [disodium-p (γ-phenyl-propyl-amino) benzene-sulphonamide-α-γ-disulphonate] in two cases of *P. knowlesi* infection in monkeys. A 5 per cent aqueous solution of the drug was used, very nearly isotonic with blood and well tolerated on subcutaneous, intramuscular or intravenous injection by all common laboratory animals.

Two cc. of the drug given intravenously to a monkey with chronic *P. knowlesi* infection caused the parasites which were fairly numerous, to disappear 24 hours after injection. A second monkey undergoing its first attack—which is always fatal—was given 2 cc of the drug intravenously when 40 per cent. of the red cells were infected and it had haemoglobinuria. Next day there was a marked fall in the parasite count, and degenerative changes were noted in the parasites. A similar dose was given intramuscularly 24 hours later following which parasites rapidly disappeared from the blood and did not reappear for 12 days. They were then scanty and soon completely disappeared without further treatment. The authors conclude that the drug is a specific for *P. knowlesi* infection in monkeys.

J D Fulton

CARR (Henry P.) *A. albimanus* Breeding in Relation to Degree of Shade in Breeding Places.—*Southern Med J* 1938. July Vol. 31 No. 7 pp. 803-805 With 2 figs.

The author records observations in Cuba on the effect of shade on the breeding of *A. albimanus*. In streams exposed to sunlight larvae are numerous even though the stream be stocked with *Gambusia*. Abundant growth of *Spirogyra wicksii* protects the larvae from the depredations of the fish. If a portion of such a stream be shaded the *Spirogyra* disappears within a month and so do the larvae. Similar adverse effects on mosquito breeding are noted even if larvicidal fish are not present—this may be due to the effect of shade on the microscopic organisms which constitute the food of the larvae. In Cuba the planting of shade trees alongside watercourses is an important anti-malaria measure. *Ficus benjamina* is the tree most favoured.

N W

GALVÃO (A. L. Ayrosa) & LANE (J.) Nota sobre os Nyssorhynchus de S Paulo VII Estudo sobre as variedades deste grupo com a descrição de *Anopheles* (*Nyssorhynchus*) *albiparvus* Arrib 1878 var *limai* n var [A Note on the Nyssorhynchus of S Paulo 7 A Study on the Varieties of this Group together with a Description of *Anopheles* (*Nyssorhynchus*) *albiparvus* Arrib.]—Reprinted from *Ann Facul Med Univ São Paulo* 1937 Vol. 13 pp 211-238. With 12 figs (4 on 2 plates) English summary

The paper includes figures of eggs of a considerable number of species and varieties many of them strikingly distinct from one another. The authors also give keys to the females, based on familiar external characters also to male terminalia also to eggs. The paper includes the description of a new variety of *Anopheles albiparvus* which differs from the typical form mainly in egg characters. P A Buxton

LEFEBVRE (M.) *A minimus* vecteur principal du paludisme au Laos. [*A minimus* Principal Vector of Malaria in Laos.]—*Bull Soc Path Exot* 1938 May 11 Vol. 31 No 5 pp 387-390

All regions in Laos in which *A minimus* is very abundant are without exception intensely malarious. Hilly country of moderate elevation covered in part with thick forest with hill torrents is specially favourable to *A minimus* and such country is plentiful in Laos. This anopheline is rare in flat low lying places but in the hills where it is abundant it may be found breeding also in stagnant water. This adaptation probably enables the species to persist throughout the year and to multiply excessively immediately after the advent of the rains it explains too the constancy of malarial endemicity wherever it abounds.

Three other species probably play a rôle of secondary importance in the transmission of malaria in special areas in Laos. *A maculatus* at high altitudes and on deforested mountains may be dangerous. *A jayporiensis* in the high valleys of Upper Laos where the climate is relatively cold, is only found in infected areas it is however not very prevalent. *A leucosphyrus* is also probably a vector in the cleared forest on the banks of the Mekong Malaria which can be attributed to the last three species, is characterized by seasonal recrudescence at the beginning of the rainy season whereas *A minimus* transmitted malaria tends to be constantly hyperendemic. N IV

COVELL (G.) MULLIGAN (H. W.) & AFRIDI (M. K.) An Attempt to control Malaria by the Destruction of Adult Mosquitoes with Insecticidal Sprays.—*Jl Malaria Inst of India* (formerly *Records of the Malaria Survey of India*) 1938, Mar Vol. 1 No 1 pp 105-113

The first controlled attempts in India to combat malaria by the regular spraying of dwelling houses with an insecticide which are reported in this paper have been very encouraging. In 1938 four communities in a very malarious section of Delhi urban area were the subject of experiment. The communities consisted of employees living in small but well-built quarters which could be effectively closed up. The rooms remained closed half-an-hour after spraying

The insecticide used was Pyrocid 20 diluted with 19 times its volume of kerosene oil. At first the amount used was 2 cc. per 1,000 cubic feet of air space. Later the quantity was halved. The results were as follows—

**Railway quarters**—population 461 spleen rate (July) 68 per cent. Spraying daily from July 15th to October 31st except for 11 quarters which were not sprayed for the first six weeks. Fever cases in sprayed quarters 1.4 per cent. in unsprayed quarters 45.5 per cent. After six weeks all quarters were sprayed combined fever rate in September and October 0.5 per cent. Spleen rate in November 51 per cent.

**Pumping Station**—Population 86 spleen rate (July) 88 per cent. Sprayed daily from July 15th to October 31st. Total fever cases during this period 6. Spleen rate in November 63 per cent.

**Electric Power House**—Population 295 spleen rate (July) 90 per cent. Quarters sprayed on alternate days beginning July 20th after commencement of malaria season in this area. During first two weeks 113 cases of malaria in third week 23 cases in fourth 10 thereafter 5 a week. Spleen rate in November 59 per cent. Peak of malaria epidemic in Delhi was in last week of September.

**Sevage Farm**—Population 190 spleen rate (July) 68 per cent. Each quarter sprayed every third day. Total number attending for treatment daily averaged 6 per cent. Spleen rate in November 29 per cent.

In 1937 spraying experiments were carried out in the two villages Nizamuddin and Jangpura both within the Municipal limits of New Delhi, with populations of 2,000 and 4,000 respectively. Malaria is hyperendemic in both. *A. culicifacies* probably the sole vector. Every room and cowshed in villages was sprayed twice a week from July 5th to October 23rd i.e. throughout the transmission season. Cases of fever were exceptionally few. Spleen rates in both villages were lower at the end of the malaria season than at the beginning whereas in a neighbouring untreated village the reverse was the case. In Jangpura the average enlarged spleen was 13.1 cm. from the umbilicus in November as compared with 9.3 cm. in July a remarkable change. The total cost for materials and labour worked out at about fourpence per head for the malaria season.

A. J.

Malaria might and did prevail in districts which were not within the scope of the scheme or had not yet come within its scope but was always of much lower degree. A direct correlation between house building and mortality when the sequence of events is so well marked as it is here can scarcely be denied. The rest of the argument to show that it could only be due to malaria seems satisfactory. A number of possibilities are considered as explaining the conjunction.

The improved house has created conditions which are more satisfactory for the anopheles but which are from a malarial standpoint more unsatisfactory for man. At all events mosquitoes appear to be more numerous in the new houses than in the old. Again it is considered that by house improvement the biological equilibrium of the population has been disturbed. A third and rather obvious possibility is the creation of breeding places for anopheles mosquitoes by the excavations made for building purposes and the production of man-made malaria.

It is certain that the housing operations which are all important in the campaign against plague cannot be stopped and therefore measures are required other than this for the prevention of malaria outbursts. This is a difficult matter. Quinization would necessarily be adopted and an attack made upon breeding places (sawahs fish ponds drainage channels). This is however impossible as both paddy culture and fish breeding play a very important economic rôle. There remain as measures to be adopted (1) Cleaning up of drainage channels. (2) The cutting off and burning of stalks after the harvest. (3) The drainage and drying of the sawahs after the harvest. (4) The cleaning up of the water surface of permanent ponds and of the sawah fish ponds. (5) The introduction of fish to eat the pond vegetation. (6) The possible introduction of a distribution of mosquito curtains.

*W F Harvey*

## MISCELLANEOUS.

VOGEL & J. ROUXIC. Les maladies transmissibles observées dans les colonies françaises et territoires sous mandat pendant l'année 1938 [Transmissible Diseases in the French Colonies and Mandated Territories in 1938].—*Ann. de Méd. et de Pharm. Colon* 1938 Apr-May-June. Vol. 36 No. 2 pp 352-520 With 6 figs.

This report gives statistics, from the medical records of each French colony and mandated territory of the principal tropical diseases met with in 1938 and compares the figures with those for 1935.

A short introduction indicates the more important facts revealed by the report. The diseases surveyed are classified under two headings—(1) The epidemic diseases—plague, cholera, yellow fever, smallpox and typhus. (2) Endemic diseases, some of which may assume epidemic proportions—malaria, blackwater fever, trypanosomiasis, dysentery, relapsing fever, intestinal parasites, schistosomiasis, filariasis, dengue, beriberi, yaws and tropical sloughing phagedaena. Each disease is dealt with in turn, its prevalence, the prophylactic measures and treatment employed, and the organization by which the diseases are controlled in each colony being described. Quite one-fourth of the report is devoted to trypanosomiasis, of which no less than 57 162 new cases were diagnosed in 1938.

In many diseases a fairly uniform system of treatment is employed throughout the colonies; the results are briefly discussed.

The report reveals the immensity of the task undertaken by the French colonial medical services and will be useful for reference.

J. B. Dewey

VILLARET (Bernard). Climatologie médicale des établissements français d'Océanie [Disease in Relation to Climate in the French Possessions in the South Seas].—*Rev. Méd. et Hyg. Trop.* 1938. Mar-Apr & May-June. Vol. 30 Nos 2 & 3 pp 87-108 147-171 With 6 figs (1 map) [27 refs.]

This is a study of the climatology and diseases of the French possessions in the Pacific. The 110 islands concerned lie in a huge quadrilateral with a side of 2,500 kilometres in latitude 8° to 28° S and longitude 137° to 157° W. They include the Leeward Islands of the Society group, the Marquesas, Tuamotus, Austral Islands and Gambiers; the last two groups are almost temperate. They are on the whole healthy. The chief diseases are elephantiasis, leprosy and tuberculosis; there is no malaria. They swarm with *Aedes*. The climatic conditions are described at length with graphs. The population is given as 40,000, 24,000 of whom are in Tahiti. The houses are usually found on the coastal edge, rarely more than 100 metres from the sea, i.e. in the least healthy part. The supply of potable water is usually poor and alcoholism is widespread. Malnutrition is common in some groups, especially among children. Depopulation has for the most part been arrested, a result attributed to the efforts of the French doctors. A table shows increase in the present

century except in the Marquesas where the loss is described as catastrophic—a medical post which would seem to have arrested it has been abandoned and the loss continues. A bar to the sanitating of these islands is their isolation and the consequent difficulties of sea transport. A table gives the birth and death rates of the different archipelagoes.

*Elephantiasis*—This disease is in retrogression due in at least two islands to the introduction of piped water. Its appearance in the Marquesas is of recent date and is perhaps related to the advent of political prisoners from the Leeward Islands in 1897. In the southern group of the Marquesas in 1932 19 per cent. of deaths were attributed to filariasis and its complications. In islands which are further from the Equator and drier elephantiasis is rare. The aetiology of the disease is discussed and its relation to filariasis but little information is given of the filarial incidence.

*Leprosy*—The number of lepers is estimated at 500–600 i.e. at least 1·2 per cent. 175 are collected in an isolation village in Tahiti. The family use of a single room and the absence of fear of contact are favouring factors. It is considered to be a long established disease in Eastern Polynesia. In the Marquesas the custom of tattooing is thought to have favoured its extension in the southern group where the doctor and his dispensary have been axed. In the extreme east of the Tuamotus are the atolls of Reao and Pakaruha with 340 and 200 inhabitants. Following the introduction of two lepers one marooned from a ship in 1903 and 1915 examination in 1937 showed 101 infected or suspected lepers in Reao and 71 in Pakaruha. 75 per cent. were under 15 years old. It is suggested that systematic examination of glands would facilitate early diagnosis and treatment.

Other diseases described are syphilis and gonorrhoea and tuberculosis. Yaws is found in Tahiti and the neighbouring island of Noorea the native name signifies native syphilis. *A G Bagshawe*

**KAMRA (B. L.) Incidence of Pulmonary Tuberculosis in the Punjab Villages.**—*Indian Med Gaz* 1938 Aug Vol. 73 No. 8. pp 477–478 [Summary appears also in *Bulletin of Hygiene*]

In a group of Punjab villages with populations of from 190 to 1 440 and total population of 15,884 during the period 13th December 1935 to 31st March 1938 18 640 patients over the age of 10 years were treated at the outpatient department of the Sohargarh Rattewala dispensary. Of these 53 were found, by sputum examination to be suffering from pulmonary tuberculosis. The proportion of males and females was the same. During 1936 and 1937 274 persons over the age of 10 years died of whom 22 had pulmonary tuberculosis. The morbidity ratio was thus 1 to 351 the mortality ratio 1 to 12·5.

The insanitary conditions existing in these villages (which are free from any urbanization) is described. The buildings are huddled together and overcrowding in the houses is intense. The majority of the population are cultivators and labourers who are ill housed and ill fed. Their average income is about Rs 0·1·6 daily for each person. Strict purdah is only rarely practised. Tuberculosis is therefore a problem of considerable magnitude in the villages.

[Reports of this kind are of the greatest value representing as they do the experiences of workers in general medicine who are careful to make sure of their ground.] *C B*



**DREVERKOS.** Traitement de l'ulcère phagédénique tropical par le Dmelcos intraveineux et les pansements à la P amino-phényl-sulfamide (1162 F) [Treatment of Tropical Ulcer by Dmelcos intravenously and Dressings containing p-amino-phenyl-sulphamide (1162 F).]—*Rev Méd et Hyg Trop* 1938. July-Aug Vol. 30. No 4 pp 224-232.

In the Abyssinian war the Italian doctor **FRANCHI** found that 87 per cent. of phagedaenic ulcer patients gave a strong positive intradermal reaction with Dmelcos, and treatment with Dmelcos resulted in a more speedy cure than usual treatments. Before that **RIOU** had reported the bacillus of Ducrey in extragenital ulcers in natives of Senegal. This would explain the reactions obtained by **FRANCHI** and the results of Dmelcos treatment.

The author's trials were made at Kindia in French Guinea. Some patients had the usual dressings after intravenous injections of Dmelcos at 4-day intervals others received ointment containing 1162 F. In four observations of the first category cicatrization was obtained after 98 56 20 and 77 days. In seven of the second category the corresponding periods were 11 days (a European) 21 42, 52 20 30 and 42 days. Control observations failed because the patients would not stand the long period of attendance. Details are given. The author considers the Dmelcos treatment superior to the usual methods. The ulcer rapidly loses its phagedaenic character and heals soundly. He suggests that where Ducrey's bacillus has been present the action is specific and where it has not, the benefit depends on shock. Retention in hospital is essential for at least the early part. *A G Bagshaw*

**JAMES (Clifford)** The Copper Sulphate Treatment of Tropical Ulcer and New Guinea Mouth Disease. [Correspondence.]—*Austral J* Australia 1938 June 25 25th Year Vol. 1 No. 28. pp 1108-1109

Dr James comments on **GUNTHER**'s paper reviewed recently [see this *Bulletin* 1938 Vol. 35 p. 829] and cites the results of his nine years experience in Melanesia. In his hospital in New Britain, Mandated Territory of New Guinea, ulcers and their complications accounted for most of the deaths. In these serious cases curetting or excision is often necessary followed by skin grafting with or without copper sulphate treatment. **Gunter** uses a 1/150 solution of  $\text{CuSO}_4$ . James employs a stronger solution. His method is appended.

"Copper sulphate, one ounce.

"Glycerine, two ounces.

Add carbolic, one drachm to the ounce of resulting solution.

Crush the copper put it and the glycerine into an enamel bowl and heat. Stir allow to cool, and pour off the solution, leaving any undissolved crystals in the bowl. Add one drachm of carbolic to each ounce of solution. The carbolic is an anaesthetic and diminishes the sting of the copper and the glycerine enables a strong and stable solution to be obtained. This is not the case with water.

Method of Use.—Gently clean the ulcer with wool swabs. Place the limb horizontally and apply the solution on a piece of wool rolled to the size of a pea. Continue the application until the surface feels hard and granular that is for say two to three minutes. Only good can come of prolonging the application, and should any run over on to healthy

skin though best avoided, it is innocuous. Then put on a small dressing of acriflavine on gauze and wool (1/1 000) and cover it with a hot foment and protective. This is soothing, cleansing and reduces the swelling. The same evening, the ulcer may or may not be messy as the result of the morning's application. Repeat the application then or not until the morning, according to the severity of the ulcer. Put on the acriflavine foment. On the next morning, the ulcer is usually clean and aseptic. If still a small area of dark colour repeat application. Most ulcers are clean after applications on two consecutive mornings. On the fourth morning, scarlet red ointment and adhesive plaster can be applied.

[See also this *Bulletin* 1933 Vol. 30 p 644] A G Bagshawe

MINGHETTI (Alfredo) L'autoemoterapia dell'ulcera tropicale [Auto-haemotherapy of Tropical Ulcer]—*Ann di Med Mar e Colon* 1938 July-Aug Vol. 44 No 7-8 pp 328-336 With 3 figs.

HOLLAND (E. A.) Suicide by Ingestion of Derris Root Sp In New Ireland.—*Trans Roy Soc Trop Med & Hyg* 1938 Aug 25 Vol. 32. No 2 pp 293-294

Derris root is used in the East Indies as an arrow poison and more widely as a fish poison and an insecticide. In the New Ireland part of New Guinea it is by no means uncommonly used for suicidal purposes. Vomiting usually results in ejection of the eaten root and chemical tests to detect it or its products in the residual gastric contents are not satisfactory. The proof lies in the fact that the subject has been seen eating the root or a nibbled fragment is found beside the body. Practically the only marked condition noted at autopsy is acute congestive cardiac failure. Symptoms are those of collapse with weak pulse and dilated pupils. Prompt gastric lavage and exhibition of stimulants are the best treatment. An antidote employed by the natives is the sap expressed from the roots of the banana plant which acts by producing further emesis. H H S

HOLLAND (E. A.) Some Vegetable Poisons of New Guinea.—*Trans. Roy Soc Trop Med & Hyg* 1938 Aug 25 Vol. 32. No 2 p 295

This is little more than a note calling attention to two vegetal poisons found in New Guinea and mentioning others. The two are *Barringtonia speciosa* which is used for fish poisoning and also with homicidal and suicidal intent, and contains prussic acid or some powerful cyanogenetic principle and *Pangium edule* a fruit which is wholesome when ripe but if not ripe causes illness and even death. There is also a wild tree of this species which is poisonous fruit and kernel, at all stages. Its toxic constituent is the same.

Other poisonous plants mentioned are *Dioscorea triphylla* [see this *Bulletin* 1938 Vol. 35 p 76 where another toxic species of *Dioscorea* is referred to] *Amorphophallus campanulatus* *Alocasia indica* *Tacca pinnatifida* and *Entada scandens*. [It would be a study both interesting and instructive to determine the toxic principles and modes of action of these.] H H S

HARRISON (G. A.) Estimation of Haemoglobin in Undiluted Blood, using a Lovibond Comparator.—*Lancet*. 1938. Sept. 10 pp 621-622. With 2 figs.

The paper describes a simple method for the clinical estimation of haemoglobin which avoids errors of dilution.

Blood is run into a special cell and compared by transmitted light with a series of coloured glasses in a Lovibond Comparator. The cell consists of two plates of optically worked white glass held apart at a fixed distance (+ 3 per cent error) and takes about 0.03 cc. blood. The colour standards are combinations of red and yellow Lovibond glasses cemented together and mounted in a revolving carrier—the colours are said to be permanent in hue saturation and brightness. The instrument is calibrated to read directly percentages corresponding to the Haldane scale. The apparatus is prepared by The Tintometer Ltd. Milford, Salisbury.

F Murgatroyd

DURIEUX (C.) & ARQUIÉ (E.) Intérêt que présente la conservation à basse température d'un échantillon de sang de malade pour le diagnostic des manifestations fébriles dans les pays chauds. [Conservation of Blood for Diagnostic Tests in Warm Climates].—*Ann de Méd et de Pharm Colon*. 1938 Apr-May-June. Vol 36 No 2. pp 334-340.

In French West Africa (and elsewhere) occur diseases which it is impossible to diagnose without the aid of a laboratory. The authors have investigated the length of time which may elapse between the time of taking a sample of blood and of its yielding satisfactory results on examination at a laboratory when the sample has been maintained in a cold environment such as ice in a thermos flask. Some examples are given. Blood from a typhoid fever patient after a delay of 11 days in transit gave a growth of *Bact. typhosus* in 24 hours. Another which had taken 15 days gave a growth in 5 days. From a patient with *Bact. paratyphosus A* infection gave a growth in 48 hours after 12 days in transit. haemolytic streptococci grew from blood after 13 days journey. pneumococci after a like interval. Such a length of time would allow specimens to be sent from anywhere in a district even remote.

H H S

BAILEY (Harry D.) A Practical Stain for the Spirochetes of Syphilis and Vincent's Angina.—*Jl Lab & Clin Med* 1938. June. Vol 23 No 9 p 980 [Summary appears also in *Bulletin of Hygiene*]

Smears of serum exuding from scraped lemons, or of tissue juice, or of ulcerative material are dried and fixed by heat.

1. Cover with N/20 HCl for 10 seconds.
2. Wash in running water 5 seconds.
3. Gram's iodine 5 to 10 seconds. Wash.
4. Aniline gentian violet 5 to 10 seconds. Wash.
5. Gram's iodine 5 to 10 seconds. Wash.
6. Aniline gentian violet 5 to 10 seconds. Wash blot and examine.

A deeper coloration may be obtained by repeating the iodine and aniline gentian violet a third time. Gentian violet without aniline oil may be used. The stain is not permanent but the method is better than dark ground illumination where spirochaetes are few. C IV

RADHAKRISHNA RAO (M V) *Cirrhosis of the Liver in Northern Circars (South India)*—*Jl. Indian Med Assoc* 1936 Dec. & 1937 Jan. Mar Apr May June & July Vol. 6 Nos. 3 4 6 7 8 9 & 10 pp 135-138 190-201 304-312 363-371 438-445 512-523 567-571 With 29 figs. (28 on 7 plates) [251 refs.]

The following papers reprinted from the Journal of the Indian Medical Association December 1936 January 1937 and March to July 1937 form a thesis which is based upon an investigation under taken to elucidate the important problems of cirrhosis of the liver as met with in the Northern Circars.

*Definition and Classification of Cirrhosis of the Liver*—The main headings of the author's classifications are —

(A) *Degenerative*

- 1 With pseudolobulation—(a) Portal cirrhosis  
(b) Toxic cirrhosis
2. Without pseudolobulation—cardiac fibrosis

(B) *Inflammatory*

- 1 Biliary sclerosis.
2. Diffuse interstitial infections
- 3 Periportal and focal sclerosis.

*Portal Cirrhosis*—A chronic progressive diffuse degenerative hepatitis and fibrosis of obscure aetiology usually fatal commonly seen in the poorer class in the third and fourth decades in the Northern Circars.

The disease is characterized clinically by emaciation secondary anaemia, subicterus dry skin atrophic liver enlarged spleen, prominence of superficial abdominal veins ascites and a cholaemic termination. Histologically the parenchyma of the liver is divided by a collagenous connective tissue net work, into rounded islands of various sizes containing two or more of the so-called lobules.

Tobacco bacillary dysentery and malaria were thought by the author possibly to predispose to the condition but this is so speculative that it seems of little value. He states that alcohol and arsenic played little part in the production of cirrhosis and excessive indulgence in hot spices was not a marked feature [he also states 'excess of chillies in the diet was almost a constant finding'] Dietetic deficiencies appeared to be important factors non-specific focal infections were commonly present and more than 75 per cent. of the patients had some evidence of syphilis anti-syphilitic treatment seemed to produce significant results. Since splenic enlargement was observed in a number of cases before the onset of ascites the author thinks it is probable that the hepatic lesions are due to toxæmia of splenic origin but as he says it is 'far from clear

Detailed descriptions of the findings at autopsy and the clinical features are given. The duration of life after the onset of ascites was from 2-12 months and anti-syphilitic treatment was most important but only in a small number of cases did it give good results.

*Toxic Cirrhosis* (a) *Subacute toxic cirrhosis of infants*—A progressive rapid and fatal disease commonly seen in the children of middle and rich class vegetarian Hindus between the ages of 1 and 3 years characterized in the early stages by a progressive persistent and painless enlargement of the liver irregular intermittent fever and constipation, and in the later stages by gradual contraction of the liver

jaundice enlargement of the spleen and ascites. Histologically the liver showed subacute necrosis of the parenchyma, extensive obliterative lesions of the smaller divisions of the hepatic venous tree and replacement fibrosis. Attempts at regeneration of the hepatic parenchyma were usually not marked.

Chronic alcoholism in the parents, kala azar malaria, syphilis, parasitic infection of the liver or dietetic errors were not found to be aetiologicaly related to the disease. The course suggested a toxic cause but this could not be determined.

The duration was rarely more than 6-10 months from the onset of the first symptoms. The prognosis was uniformly bad and the treatment empirical, symptomatic and unsatisfactory.

(b) *Toxic cirrhosis of adults*—Four cases were diagnosed at autopsy. Poisoning by any of the commoner agents was not found and the aetiology did not differ from that of portal cirrhosis but perhaps arsenicals used for the treatment of syphilis may have played some part although an endogenous toxin could not be excluded.

*Cholangitic Hepatic Sclerosis*—The disease is characterized by chronic icterus, enlarged liver, enlarged spleen, bilirubin without scholha of the stools, absence of ascites and evidences of portal obstruction until late in the disease, and by an age incidence between 20 and 40 years. Histologically a pericholangitic leucocytic infiltration, widespread fibrosis irregularly following the portal ramifications leading to an attenuation of hepatic foci and absence of insular pseudolobulation and biliary distension of the bile ducts are some of the important features in uncomplicated cases.

In most cases the history of the onset was preceded by dysenteric attacks or by fever of 8-14 days duration suggestive of paratyphoid fever and the author concludes that bacillary dysentery and probably paratyphoid fever are significant aetiological factors. [There is no mention of any attempts which may have been made to determine, for example by agglutination reactions whether these patients had been infected with paratyphoid.] Some of these patients also gave a history of intermittent ague-like attacks of fever. The author excludes malaria as the cause of this fever for one reason by the absence of malarial parasites in the blood clinically " [but as the patients gave a history of fever it is not clear when the examinations were made ]

The disease was slowly progressive and patients rarely survived more than 2 years after the onset of jaundice. The clinical picture was so characteristic that the diagnosis was not difficult but as no treatment brought any benefit the prognosis was hopeless.

*Other Forms of Fibrosis of the Liver*—(1) *Cardiac fibrosis*—In three examples of this the author found the liver showed macroscopically unequal and irregular scarring rich in elastic fibres, around the divisions of the hepatic vein. The reticular framework of the sinusoidal capillaries around the central veins was disorganized as a result of the parenchymal atrophy due to chronic venous engorgement. Condensation and sclerosis of the reticular framework were further stages in the development of the cardiac fibrosis which is thus essentially a fibrosis replacement.

The parenchymal mantle showed no loss of pattern in the regenerated areas, which is in contra-distinction to the findings in portal and toxic cirrhoses.

(2) *Syphilitic sclerosis*—In spite of the high incidence of syphilis no typical manifestations of syphilis were seen one case of late congenital syphilis was examined but the appearances were not typical.

(3) *Other types of fibrosis*—Examples of fibrosis associated with tuberculosis schistosomiasis or hepato lenticular degeneration were not seen.

*The Causation of Ascites in Northern Circars*—An enquiry into this was undertaken on account of the prevailing view that commonest form of ascites in India is not due to cirrhosis of the liver but to a fibrosis of the peritoneum resulting from irritation of the peritoneum by the toxins of the bacilli of dysentery. The author disagrees with this and concludes that decompensated cardiac disease and hepatic cirrhosis are the most common causes of ascites in the Northern Circars.

*Cirrhosis of the Liver and Splenomegaly*—Cirrhosis of the liver was one of the commonest causes of splenic enlargement which falls into two groups in one the enlargement of the spleen is moderate and can be accounted for by the chronic venous congestion in the other the enlargement is marked and cannot definitely be explained but the author suggests that it may be the result of a hyperplastic reaction due to toxins circulating in the blood consequent on an impairment of the detoxicating function of the liver.

*Metabolic disturbances in Cirrhosis of the Liver*—After recapitulating standard physiological knowledge of liver function the author summarizes his own investigations in cirrhosis which showed—

(1) Fasting hypoglycaemia due to a reduction in the true glucose content of the blood and intolerance for glucose and in some cases for laevulose and galactose

(2) No significant changes in the protein metabolism

(3) Diminished cholesterol content of the plasma

(4) Latent bilirubinaemia urobilinuria and occasionally bile salts and bile pigments in urine

(5) Delayed coagulation of the blood and diminished fragility of the red blood cells and

(6) Retention of the Rose Bengal dye after intravenous injection.

He concludes that these disturbances of metabolism are not specific for this disease.

*Hepatic Function Tests & Cirrhosis of the Liver*—The author concludes that—

(1) The Rose Bengal dye excretion test is reliable in the diagnosis of hepatic disorders

(2) The laevulose tolerance test cannot be regarded as a reliable diagnostic aid in the study of hepatic diseases

(3) The galactose tolerance test is useful in the differential diagnosis of cases of early jaundice but in chronic hepatic disorders the test appears to be unsatisfactory. Following the ingestion of galactose the blood sugar concentration appears to be more reliable than the urinary concentration of galactose in the diagnosis of hepatic disorders

(4) Clinically the van den Bergh reaction is of very little value in the differential diagnosis of jaundice. Apart from an indication of the extent of impairment of biliary excretion the test is of little practical importance as an hepatic efficiency test. In the absence of haemolytic disease an increased concentration of bilirubin in blood is suggestive of hepatic dysfunction and

(5) The Widal & haemoclastic crisis is of doubtful value in the diagnosis of hepatic disorders

With the exception of the Rose Bengal dye excretion test the hepatic function tests gave variable results in cases of cirrhosis of the liver. Hepatic function tests do not permit quantitative estimations of liver function and single tests may be misleading on account of the dissociation of hepatic function in disease

*Cirrhosis of the Liver Following Chronic Intoxication with Carbon Tetrachloride* An experimental study—Repeated administration of small doses (0.1 cc. to 0.2 cc. once or twice weekly) of carbon tetrachloride subcutaneously to albino rats produced toxic cirrhosis. The fibrous tissue was mainly distributed around the hepatic venous tree, which showed sclerotic changes in its larger divisions—its genesis in the cirrhosis thereby induced was traced to a disorganization, collapse condensation and sclerosis of the peri-annusoidal reticulum around the hepatic terminals, consequent on a necrosis of the parenchyma in the same area. *F Mergalroyd*

SABRUC (Edouard) Anatomie pathologique du bérubéri jugée par des autopsies faites en Cochinchine. [The Pathological Anatomy of Beriberi].—*Rev Méd et Hyg Trop* 1937 May-June & July-Aug Vol. 29 Nos. 3 & 4 pp 129-150 207-229

This long article deals only with the macroscopic, naked-eye changes seen in fifty-two autopsies made on beriberi patients in Cochinchina. The findings in each case are detailed and the author then proceeds to analyse the conditions observed. Of the total 41 died in an acute cardiac crisis, 10 from other or intercurrent disease and one committed suicide. Of the 10 with other diseases four died from tuberculosis pulmonary and visceral, two from uraemia, two from broncho-pneumonia one from aortic regurgitation and one of cancer of stomach and liver. Half the patients were in their third and fourth decades, 12 between 20 and 30 years and 14 between 30 and 40 years. 46 were men 6 were women, three of them post-partum cases. In 29 there was no oedema, in 22 it was localized and in one general. 16 showed pleural effusion. 46 had pericardial effusion 40 of them less than 500 cc. The heart was enlarged, weighing 250-350 gm. in 20 of the subjects very large, 350-550 gm. in 21 eighteen of whom died with a cardiac crisis and 9 had enormous hearts of over 550 gm. Ascites was present in 18 one litre of fluid in three but as much as 8 litres in one case.

As regards the different organs changes were most noticeable in the heart, liver kidneys and adrenals, and particularly the heart. The author considers great dilatation of the right auricle as by itself almost pathognomonic pericarditis with effusion is very common. He has nothing to say of the myocardium except that more study is required. Changes in the liver are mainly congestive—nutmeg liver—with parenchymatous hepatitis and in chronic cases cirrhosis, hypertrophic or atrophic. The kidneys may be merely congested or show actual glomerular nephritis with lobulation. The adrenals call for further study "it is probable," says the author that all the endocrine glands are affected in some degree, more or less.

GIROLAMI (Mario) I progressi della patologia tropicale in Italia durante l'Era Fascista. [The Progress in Tropical Pathology in Italy]—*Arch Ital Sci Med Colon e Parassit* 1937 Nov & Dec Vol. 18 Nos. 11 & 12 pp 667-700 722-764 & 1938 Jan. Vol. 19 No 1 pp 31-57

FENG (Lan-Chou) A Critical Review of Literature regarding the Records of Mosquitoes in China. Part I. Subfamily Culicinae, Tribe Anophellini. Part II Subfamily Culicinae, Tribes Megarhinini and Culicini.—Reprinted from *Peking Natural History Bull* 1938. Mar & June. Vol. 12. Parts 3 & 4 pp 169-181 285-318 [117 refs.]

The author presents a compendious review of our present knowledge of Chinese mosquitoes.

It is only within very recent years that a general knowledge of the mosquitoes of China has been acquired, and the present paper is a valuable statement of what is at the moment known. The author gives a list of the mosquitoes recorded from China recording under each its geographical distribution within China the type of breeding place and the habits of the adults. Relation of species to malaria and filariasis is dealt with shortly. The author has also carried out the thankless task of tabulating those records which should be regarded as erroneous.

According to present knowledge the mosquito fauna of China consists of 98 species 24 of which are members of the genus *Anopheles*  
P A Buxton

MATHIS (Maurice) Élevage en série (cinq générations) d'un *Stegomyia* de Java *Aedes annandalei* Theobald. [The Rearing of Five Successive Generations of a Javan Mosquito]—*Bull Soc Path Exot* 1938 June 8 Vol. 31 No 6 pp 493-497

The insect occurs in India and the East Indies and bites man in forests though it does not enter houses. The author has reared it in Paris and gives information about the biology as observed there. It appears that as might be expected in a forest insect the adult can only live if the atmospheric humidity is exceedingly high.

P A B

THOMSON (R. C. Muirhead) The Reactions of Mosquitoes to Temperature and Humidity.—*Bull Entom Res* 1938. July Vol. 29 Pt 2. pp 125-140 With 6 figs. [18 refs.]

If one observes the resting places of mosquitoes it is difficult to know whether their choice depends on temperature humidity light, smell, or a combination of several of these. With this in mind the author has devised and carried out analytical experiments in which single factors were isolated, and has made a considerable advance in interpreting the actions of wild mosquitoes.

In experimenting with humidity the choice chamber devised by Gunn and Kennedy was used. It is simple physically sound and capable of adaptation to a wide range of problems. It consists essentially of a flat glass dish in which it is possible to provide a gradient of humidity at one temperature. The insects are introduced into it and observations made of their movements and the position at which they come to rest.



Thomson has worked with *Culex fatigans* and finds that the nutritional state in females makes a considerable difference to the insect's reaction, a point of some importance. In one set of experiments he made use of females which had fed successfully on canary the night before. They were indifferent to humidity over most of the scale even if the humidity on the two sides of the chamber was widely different (for instance 50 and 80 per cent). But they avoided humidities of 85 per cent. and over and at this part of the scale were so sensitive that they could distinguish 1 per cent. over a distance of 20 cm. On the very low part of the humidity scale they have some perception and will settle rather at 60 per cent. than at 10 per cent.

There is some evidence that the insect's behaviour in moist air is determined rather by perception of relative humidity than of saturation deficiency. The author points out an apparent anomaly, that the female avoids very high humidities (and even hungry females do this) though it is at the highest humidities that life is longest.

Turning to the study of temperature the author makes valid objections to certain previously published observations, in which the fact that a difference in temperature invariably makes a difference in humidity has not been perceived. It is only now after it has been shown that the insect is indifferent to humidity over the middle part of the scale that it becomes legitimate to make use of this range of humidity in offering a choice of temperatures. The female *Culex* is extremely sensitive to temperature near the upper limit of what suits it and can perceive a difference of 1 C. over a space of 20 cm. The upper temperature limit is greatly affected by the insect's nutritional state. Temperatures below 15°C. are avoided but the reaction is not very sharp, partly at least because the insect is somewhat inactive.

There is, therefore, a contrast between the insect's reaction to humidity and to temperature. If it is offered a choice between a moderate and a very high humidity it may fly from the drier to the moister part of the dish and then turn round so as to avoid the moist area, but if it settles in the moist area there is no particular tendency to move. On the other hand, if the contrast is between moderate and high temperature the female will avoid the high temperature, moreover if she settles there she will be more active and will therefore move about. This in itself, even if her movements are random, will tend to her eventually settling in the cooler part of the chamber. One may say therefore that in both cases there is an avoiding reaction or phototaxis, but at high temperatures there is also a tendency for movement to be increased, i.e. a kinesis.

The experiments, essentially simple and well planned, provide a considerable and solid advance in our understanding.

P. A. B.

BRETT (G. A.) On the Relative Attractiveness to *Aedes aegypti* of Certain Coloured Cloths.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1933. June 25. Vol. 32. No. 1. pp. 113-124. With 1 fig. [12 refs.]

The experiments are designed to tell us whether *Aedes aegypti* alights more frequently on cloth of one colour than another and if so whether its behaviour is influenced by the brightness or the colour of the stuff.

The coloured cloths were stretched over the experimenter's hand a space preventing the insects taking blood. In each group of experiments two pieces of cloth were sewn together so that work was done with the colour and white (in equal areas) and then with the same colour and black. Investigations were carried out in diffuse daylight with female mosquitoes a few days old which had not had a blood feed. The details of procedure were well thought out fully recorded and statistically treated. The colours employed are specified by trichromatic coefficients. These being numerical, have been compared statistically with numbers of insects alighting.

One may select a single experiment to show the type of result obtained. The black cloth reflected 2 per cent of light the khaki 14.8 the white 55.6. The percentages alighting when a single choice was offered were khaki 31.7 black 63.3 or khaki 60.4 white 39.6 several thousand alightings being recorded. Such an experiment shows that the insect's choice is a long way from absolute and that the darker of the two materials seems to be preferred.

Working in this way and using black white and 9 colours (each of which is offered to the insect with black and also with white as an alternative) the author can arrange his colours in an order of attractiveness. Roughly speaking the cloths which reflect less light are those on which the insect alights more frequently. But light khaki (reflecting 40.3 per cent) receives fewer visits than white (reflecting 55.6 per cent.) and the difference is significant. Moreover the order of attractiveness with black and with white as alternatives are different in several points.

The experiments lead one to the conclusion that though the brightness of the cloth is important the insects have also a definite reaction to colour. They preferred the particular red which was used, though it reflected more light than several other colours and they avoided the light khaki as already mentioned. P A B

YOELI (M.) & MER (G. G.) The Relation of Blood Feeds to the Maturation of Ova in *Anopheles elutus*—*Trans Roy Soc Trop Med & Hyg* 1938 Jan. 25 Vol. 31 No 4 pp 437-444

Blood contains a factor associated with the proteins of serum and cell stroma which is necessary for the complete maturation of the eggs. Females of *Anopheles elutus* fed with sugar or fruit juices will develop the ovary only as far as the stage II of Christophers. If fed with haemoglobin from laked blood corpuscles the same stage of development is reached. But if fed with suspended red corpuscles or with serum after the attainment of stage II complete development takes place. The necessary factor thus occurs in the cell stroma and in cell-free serum. It is not destroyed by heating for one hour at 100°C. in coagulated serum it is associated with the coagulum and it is not extracted by lipid solvents. It is not clear whether it is in the nature of an accessory substance, or whether the protein itself is exerting a specific action. V B Wigglesworth

LEESON (H. S.) The Mosquitoes of the *Funestus* Series in East Africa.—*Bull Entom Res* 1937 Dec. Vol. 28 Pt 4 pp 587-603 With 4 figs (1 map) & 2 plates. [16 refs.]

Of the members of the *funestus* group of Anophelines in East Africa only *funestus* type form appears to be an habitual house-frequenter

The material on which this study is based was collected in Uganda, Tanganyika and in the islands of Zanzibar and Pemba during the period February to October. Members of the *funestus* series found were 4 *funestus* Giles type form *A. lessoni* Evans, *A. rivulorum* Leeson and a new form *A. rivulorum* var. *gambellus* Evans and Leeson. The characters by which these forms can be distinguished in the larval and adult stages are given. They are most easily recognized in the larval stage. All these insects breed in similar situations: clear shaded water with growing vegetation, particularly grass. All the adults captured were taken inside buildings and of these almost all were *A. funestus*, the remaining few *A. rivulorum* and its variety. Precipitin tests showed the presence of human blood in 239 out of 458 of these; a very few contained ox blood. Out of 122 female *A. funestus* dissected 15 were infected in glands or stomach with malaria parasites.

It is well known that 4 *funestus* larvae occur in shady water, *A. gambellus* in water exposed to the sun. The author made a quantitative estimation of this difference by measuring the light intensity in the breeding places with a photoelectric cell. When the illumination is expressed as a percentage of the total light available it is found that the majority of the *A. gambellus* occur at a level of 80-100 per cent. Whereas the peak of the *A. funestus* curve is at 10-20 per cent.

V B Wigglesworth

KOOP (W. H. W.) Notes on the Identification of *Anopheles pseudopunctipennis* Theobald (Diptera, Culicidae).—Reprinted from Proc. Entom. Soc. Washington 1937 June. Vol. 39 No. 6 pp. 157-163. With 2 plates. [10 refs.]

The author calls attention to a relatively conspicuous and most reliable character by which the larva of *Anopheles pseudopunctipennis* may be recognized even with a hand lens. On the back of the post spiracular plate are two thin black processes which curve upwards and penetrate the surface film when the larva is alive. The character has been observed previously but overlooked by recent workers.

The paper also discusses the vexed question of the mesosome in the male genitalia. It appears that there is some variation in this structure and that it might have a geographical basis.

P. A. B.

GORE (Ramkrishna N.) A Modified Village Mosquito Trap.—Indian Med. Gaz. 1937 Nov. Vol. 72 No. 11 674-675. With 2 figs.

The author describes some improvements in detail for the mosquito trap previously devised (this Bulletin 1937 Vol. 34 p. 263). During most of the year the mosquitoes are killed by exposure to the sun. In the monsoon they are stupefied with smouldering tobacco and then killed in the charcoal or dung cake fire.

V B Wigglesworth.

SYDDIQ (M. M.) *Siphunculina funicola* (Eye-Fly).—Indian Med. Gaz. 1938 Jan. Vol. 73 No. 1 pp. 17-19. With 1 text fig. & 3 plates.

This is a preliminary account of an extensive study of the eye fly and its allies. All stages in the life history are described, and photographs are given. The characteristic breeding place is moist mud, particularly that contaminated by decomposing organic matter. Damp soiled

earth around pail latrines badly kept cattle stables and contaminated surface drains are typical examples. By painting a suspended electric light flex on which the flies congregated in great numbers with fluorescam and then searching for this next morning in gutters and drains, it was proved that the flies will go at least 100 yards away for food or oviposition. The flies were often observed sucking serum from wounds and ulcers. Among the organisms isolated from culture media on which the flies were allowed to crawl were *Staphylococcus aureus* non haemolytic streptococci enterococci and diphtheroids. A great reduction in the number of eye-flies in Hyderabad has taken place since all gutters drains etc have been regularly sprayed with Malarol to destroy mosquito larvae. *V B Wigglesworth*

MENG (Ching hua) & WINFIELD (Gerald F) Studies on the Control of Fecal-borne Diseases in North China. V A Preliminary Study of the Density, Species Make Up, and Breeding Habits of the House Frequenting Fly Population of Tsinan Shantung China.—*Chinese Med J* 1938 Mar Supp No 2. pp 463-486 With 3 figs

The authors have brought together a large body of information about the species of domestic flies and their relative abundance at Tsinan Shantung. The work was done as part of an investigation into the intestinal diseases of North China.

The authors had traps in a number of places and examined some thousands of flies caught in them. They also collected dung of animals and man and bred out and determined flies from it. Trapping was only commenced in August and discontinued at the end of the year when no further adult flies were caught. It was found that the commoner flies were all more abundant in August than in later months the commonest of all, *Chrysomya megacephala* disappearing in October and the species of *Musca* in December. *Chrysomya* was bred from human faeces but never from the manure of pig, cow or horse. *Musca sorbens* from the animals but not from man. *M vicina* from all the animals and man. It is curious that flies were only bred from 18 out of 28 samples of material from human beings.

P A B

VELLARD (J) Arthropodes véscants ou piqueurs connus sous le nom de *Pitos* dans les Andes vénézuéliennes. [Noxious Arthropods in the Venezuelan Andes].—*Bull Soc Path Exot* 1937 Dec. 8. Vol. 30 No 10 pp 878-884 With 6 figs. on 3 plates

In the Cordillera of Mérida cases of vesication followed by ulceration resistant to treatment are fairly common and are ascribed to insects which go under the general name of *pitos*. This term includes insects which set up lesions by their sting or bite and also those which produce the lesions by contact. The former are the more numerous and belong to several groups. *Ornithodoros* *Rhodnius* *Triatoma*, *Belostomatidae* and *Nectonetidae* certain spiders as *Lycosa raptoria* and others.

Necrotising lesions are seen often in horses and mules. a hairy spider *Loxothis* ? sp but probably not *X monstruosa* attacks man. Among the vesicants acting by contact the Automeris is widespread. Lesions produced are not as a rule of serious import and those reported as such are more often cases of leishmaniasis, or phagedaenic ulcers.

H H S

STELLA (Emilia) Gh Ixodidi dell Africa Orientale Italiana [Ticks in Italian East Africa].—*Riv di Biol Colon.* Rome. 1938. Apr Vol. 1 No 2 pp 135-153 With 4 figs. [34 refs.] English summary (8 lines)

The author presents a summary of existing knowledge about the ticks which occur in Italian East Africa. The paper will be of considerable local value, particularly to veterinarians.

The introductory part of the paper calls attention to the veterinary and medical importance of ticks. Surely the author is in error in speaking of tick-carried relapsing fever as 'widely spread in the whole of Africa'. After giving keys to genera not species full details are given about ticks known to occur in different parts of the Italian territories and in surrounding countries. It appears that the relevant literature has been carefully searched. The paper concludes with a table showing the distribution of 34 species of ticks among 8 colonies and territories. It appears that *Ornithodoros moubata* is recorded from Eritrea and Italian Somaliland. *O. scutiger* from both the above and also from British and French Somaliland. P A B

ROBERTS (J I) The Control of Bed Bugs in Railway Coaching Stock by Regular HCN Fumigation.—*East African Med J* 1938. Feb Vol. 14 No 11 pp 354-360 [Summary appears also in *Bulletin of Hygiene*]

Fumigation of railway coaches against bed-bugs must be frequent and regular in hot countries and in Kenya and Uganda it is necessary to use a very rapid method due to demands on the rolling stock. Thus special precautions to ensure that coaches are air tight are not practicable. Cyanide appeared to be the most rapid method and the quantities and times of exposure were found from tests on bugs secreted in muslin bags or plugged test tubes in hidden places in the coaches.

Zyklon is much used, at the rate of 8 oz. to a 4-berth compartment with an additional 4 oz. for lavatories, corridors and bedding-cupboards. Not less than 2 hours fumigation is necessary and this is followed by 2 hours ventilation and then 15 minutes with the coach in motion. With tests supplied and recommended by the firms making the fumigant no gas was found after this time. Among many precautions the author recommends the draining of water from the drinking water filters. Fumigation should always be done on sidings well away from station premises. Nothing is said about the importance of removing bedding or mattresses before cyanide fumigation and disinfesting them by heat or steam, or at least giving them a separate airing. However, during the 4 years of operation no accidents have occurred and disinfestation has been satisfactory.

Cellophite (paper discs impregnated with liquid HCN) is recommended for the rapidity with which it can be handled since in hot parts operators should be exposed to the gas for the shortest possible period. The whole process is incidentally thereby hastened and cellophite is cheap. One disc is used to a 4-berth compartment. Two years use have proved it to be satisfactory.

SO<sub>2</sub> is unsuitable for this type of work. It is expensive, tarnishes brass fittings, requires 24 hours' exposure and the machines break down frequently.

The relative costs of fumigation per coach are Zyklon Shs. 5/70  
cellophite Shs 2/70 SO<sub>2</sub> Shs. 22/50  
C G Johnson

OMORI (Nanzaburo) Experimental Studies on the Influence of Low Temperatures upon the Tropical Bed-Bug (*Cimex hemipterus* Fabricius) Fourth Report. On the Influence of a Temperature of 0°C.—*Taiwan Igakkaï Zasshi* (Jl Med Assoc Formosa) 1938 June. Vol. 37 No 6 (399) [In Japanese pp 1004-1013 English summary pp 1014-1015]

This is the author's fourth report on the influence of low temperatures on *Cimex hemipterus* the tropical bed bug. It deals with the longevity of eggs, nymphs and adults at 0°C. After bugs were bred and eggs laid at 27°C and 75 per cent relative humidity the experimental material was placed at 0°C and 60-100 per cent. R.H. then after periods of 7 14 and 21 days replaced at 27° or at room temperature so as to ascertain the number of survivors.

Eggs after a 7-day exposure survived to develop but for only 1 in 20 to hatch when replaced at 27°C. while after 14 days at 0°C. neither development nor hatching occurred at 27° No mention of controls is made in the author's summary.

When instars I-V and adult males and females fed and unfed were subjected to 0°C. only a few fed adults and first instars survived a 7-day exposure. First instars were the most resistant stage although the author had found them to be the least resistant at 3° 6° and 9°C. more unfed than fed first instars survived. Some adult males remained normal and virile after 7 days at 0°C. while none was alive after 14 days. Two out of 14 laying females laid eggs subsequent to a 7-day exposure and the author concluded that the spermatozoa were therefore still functional. Since in bed-bugs however eggs are fertilized while still in the ovarioles it may be that if such fertilized eggs survived even if free sperms in the body cavity perished the same result would have been obtained.  
C G Johnson

CALDWELL (A. F) A Note on the Chemistry and Preparation of Insect Sprays containing Pyrethrum.—*Jl Malaya Branch Brit Med Assoc* 1938. Mar Vol. 1 No 4 pp 336-341 [16 refs.] [Summary appears also in *Bulletin of Hygiene*]

The author is particularly interested in the problem of killing mosquitoes in aeroplanes. The paper deals principally with sprays containing pyrethrum.

In the short section devoted to fumigation the view is expressed that fumigation is not a satisfactory method of destroying mosquitoes surely this is not in accordance with general experience? The author then passes to sprays of which one type is a watery solution or emulsion of Derris pyrethrum etc. [Perhaps these watery sprays deserve more attention than they receive here for with them there is no danger of fire.] The second type of spray has a basis of kerosene with the addition of phenol, orthodichlorobenzene essential oils etc. The third type consists of pyrethrum extract in kerosene with or without the addition of some perfume.

A short account is given of the properties of the pyrethrins the two insecticidal substances which occur in the flowers of pyrethrum. The author recommends that the powdered drug should be assayed (the method being given) and that it should not be used unless the pyrethrins

exceed 0.5 per cent. This drug is then percolated cold with kerosene and diluted to contain 0.075 per cent pyrethrins. The risk of fire with this spray is very little and may be reduced by substituting carbon tetrachloride for half of the kerosene if sufficient pressure is available to spray this more dense solution. No information is given on the size of the droplet which is desirable or on any tests on mosquitoes which may have been performed. P A B

CRAUFORD-BINSON (H. J.) An Improved Method for testing Liquid Contact Insecticides in the Laboratory.—*Bull. Entom. Res.* 1938 Mar Vol 29 Pt 1 pp 41-56. With 7 figs. & 1 plate. [15 refs.]

This paper describes a method for testing contact insecticides and data are published to show the necessity for rigid control of variables before during and after dosage. The disadvantages of previous methods are discussed.

The author chooses an immersion technique and considers that the risk of stomach poisoning is outweighed by advantages such as equal degrees of treatment, possibility of good temperature control during application, the use of large numbers of insects and the independence of the method on their activity. The work deals exclusively with the effect of a suspension of derris resin in water (with emulsifier) on the beetle *Ahastertus (Cathartus) advena*. The technique of dipping which ensures a minimum of handling (an important factor in eliminating errors due to removal of insecticide after application) is described in detail. Dipping is rigidly standardized and the insects considered to be dead if they show no movement when placed 6 m. from an electric light.

Great stress is laid on the necessity for controlling temperature and humidity before and after immersion and for keeping the insects with constant access to food before the experiment under conditions resembling those occurring in nature.

Insects starved for 24 hours before dipping gave more consistent results than those used immediately on removal from food. The effect of the insecticide on mortality was considered 24 hours after dipping, by which time the mortality rate had passed its initial rapid phase of the 4 hours immediately following treatment. The 48 hours without food does not introduce an appreciable error due to starvation provided that the insects were not more than 20 days old when dipped. From the 20th day the mortality from treatment is correlated with mortality due to starvation alone, but before this time the insecticide produces a high mortality not shown with starved, untreated insects. This, in the author's opinion, may be due to the unhardened state of the cuticle.

Temperature is considered to be the most important factor to control and 25°C was maintained before during and after dipping. At immersion temperatures below 25°C there is a rapid decrease in mortality, and insects bred at 20°C had a greater resistance to the insecticide than those bred at 25°C.

The author claims that the results are more accurate than any hitherto published on aqueous insecticides and that, unlike some other methods, they are repeatable from day to day and with different persons. This he considers to be due to the rigid standardization of variables before and during the experiment. C G Johnson

- BEEHAN (Joseph A.) & HUNTER (Warren C.) Fatal Nicotine Poisoning. A Report of Twenty-Four Cases.—*Arch Pathology* 1937 Oct. Vol 24 No 4 pp 481-485 [12 refs.]

Nicotine ranks fourth among the poisons responsible for accidental homicidal and suicidal deaths in Portland U.S.A. The ready availability of insecticides containing nicotine is chiefly responsible for this. Twenty four cases are here described mostly suicides in which death was caused generally within ten minutes by drinking Black Leaf 40 a commercial insecticide containing 40 per cent. of nicotine sulphate

V B Wigglesworth

- BURTON (P. A.) Studies on Populations of Head-Lice (*Pediculus humanus capitis* Anoplura) II.—*Parasitology* 1938 Jan. Vol. 30 No 1 pp 85-110 With 2 figs [14 refs.]

This is the continuation of a study already noted (this *Bulletin* 1936 Vol. 33 p 637) in which the numbers of head-lice occurring naturally on different individuals have been estimated by dissolving a complete crop of hair and counting the residual lice. It is important that the entire head should be shaved if true figures are to be obtained by this method. More than 2,000 crops of hair collected from Nigeria (Sokoto) Kenya (Nairobi and Nakamega) Ceylon (Colombo) and Palestine (Jerusalem) have been examined and the incidence and degree of infestation correlated with race sex age quantity of hair and season.

The great bulk of the infestations are very slight (from 1-10 lice per individual). Where the proportion of people infested is large the mean number of lice per individual is increased. With few exceptions lice increased in number in the cooler wet season but it is uncertain whether this is a direct effect of climate on the insect or the reflection of the altered habits of the host. Longer hair is generally associated with larger infestations. But the most striking relation is that with age. In all localities the younger age groups show the greatest number of infestations. For instance at Sokoto there were 20 per cent. of infestations for 6-10 years 11 per cent. for 11 to 20 years only 4 per cent. at 21 years and upwards

V B Wigglesworth

- IOFF (I. G.) & TIFLOV (V. E.) Help in the Determination of the Fleas (Aphaniptera) of the South-Eastern European Parts of the U.S.S.R. —116 pp With 157 figs. 1938 Saratov Provincial Publishing Office.

- COMANDON (J.) & DE FONBRUNE (P.) La chambre à huile. Ses avantages pour l'étude des micro-organismes vivants la culture des tissus et la micromanipulation. [Oil Chamber for Study of Living Microorganisms, Tissue Culture and Micromanipulation.]—*Ann Inst Pasteur* 1938 Feb Vol. 60 No 2 pp 113-141 With 13 figs. & 4 double plates. [21 refs.]

The paper describes a technique for the study of cells or other objects in what is termed an oil chamber. A small droplet of liquid paraffin is placed on a cover glass and a small quantity of the liquid containing the objects to be examined, spirochaetes blood cells, amoebae etc. is injected by means of a fine pipette inserted through the oil on to the cover glass so that it forms a drop between the paraffin



and the glass. The cells sink on to the surface of the cover glass and excess of fluid may be removed by a fine pipette. The cover glass is inverted and supported for microscopic examination, which can be conducted without danger of evaporation. By means of fine glass needles the cells can be manipulated as necessary. The method can also be employed as a means of tissue culture. C M WEXON

SHORTT (H. E.) PANDIT (S. R.) MEXON (R. P.) & SWAMINATH (C. S.)  
The Absence of Effective Immunity after Cure of Protozoal Infections.—*Indian J. Med. Res.* 1938. Jan. Vol. 25 No. 3. pp. 763-777

The authors describe a series of experiments directed to test the persistence of immunity in *Babesia canis* infections in dogs and *Plasmodium knowlesi* and *P. cynomolgi* infections in monkeys. Great care was taken to bring about by adequate treatment complete eradication of the infections in a number of animals. All known tests to prove the absence of parasites, including the inoculation of relatively large quantities of blood into clean animals were used. The conclusion is reached that in the case of all these infections immunity is dependent upon the persistence of parasites in the body and where the infection has been entirely eliminated there is as marked a susceptibility to re-inoculation with the homologous strain of parasites as there was to the primary infection. The results obtained were not sufficient to enable conclusions to be drawn regarding the relative severity of primary and secondary attacks. C M W

ARMAGHAN (Veronica) & MEDLARK (George C.) A Survey of Intestinal Protozoa and Effect of Aldarson on *Giardia* and Other Intestinal Protozoa of Man.—*Amer. J. Hyg.* 1938. Mar. Vol. 27 No. 2. pp. 250-257

Aldarson\* (3-amino-4-hydroxy-phenyl-arsonic acid) has been used successfully by the authors for freeing rats and mice of lamblia infection. It seemed desirable to test its action on this infection in man. A number of cases which came to light during an intestinal protozoal survey amongst the inmates of an institution for the feeble-minded were utilized for the purpose. Judging from an observation period of 12 days after treatment of 30 cases, the drug was effective in 65 per cent of lamblia infections, 100 per cent of *E. coli* *C. mearnsii*, *E. magna* and *I. bütschlii* infections and in 88 per cent and 33 per cent of *T. hominis* and *E. histolytica* infections respectively. The best dosage appeared to be 500 milligrams at bedtime on one day followed by four doses of 250 milligrams on each of the next two days. The results seem to indicate that further trials of the drug are desirable. C M W

BOYER (Henri) La résistance des protozoaires et des protozooses aux médicaments [Drug-resistant Protozoa and Protozoal Diseases].—*Gaz. hebdom. Sci. Méd. de Bordeaux* 1938. Jan. 23 Vol. 59 No. 4 pp. 51-53

The author advocates the treatment of protozoal infections by a combination of two or more drugs, each drug being given in a dose

which employed alone would be insufficient to influence the parasite. The combined action of more than one drug would avoid the danger of production of resistant strains of an organism.

C M W

HOLLANDE (André) Les amibes du type *Limax* dans leurs rapports avec les flagellés. — *Amoebae of the "Limax" Type considered as Flagellates.* — C R Acad Sci 1937 Dec 27 Vol. 205 No 26 pp 1439-1441

It is well known that certain free-living amoebae of the *Limax* type which may be cultivated on suitable media are able at times to develop flagella and behave as flagellates. Of these there are three types which differ in the number of flagella—two three or four. It has generally been supposed that the flagellate stages serve merely for distribution of the amoebae and that reproduction occurs only in the amoeboid stage. Working with an amoeba which produces four flagella (*Tetramitus*) the author finds that reproduction may occur at any stage of development and that the protozoon is actually a flagellate and not an amoeba. The other forms also are to be regarded as flagellates and the author believes that they should be grouped together in one family, the Vahlkampfiidae amongst the Protomastigina (Order Protomonodida of the Class Mastigophora)

C M W

WICHTERMAN (Ralph) The Present State of Knowledge concerning the Existence of Species of *Nyctotherus* (Ciliata) living in Man. — *Amer J Trop Med* 1938 Jan. Vol. 18. No 1 pp 67-76 With 5 figs. on 1 plate. [28 refs.]

Four representatives of the genus *Nyctotherus* have been recorded as ciliate parasites of the human intestine. These are *N. faba* Jacoby and Schaudinn 1899 *N. africanus* Castellani, 1905 *N. giganteus* (Krause 1906) and *N. sp.* Monner and Dang teh Trinh 1932. Some of these have been recorded by other observers since their original descriptions. The author of the present paper reviews the various records and with ample justification arrives at the conclusion that all the records are fallacious and that quite apart from the question as to whether the parasites observed were actual parasites and not coprozoic organisms they did not possess the characters of members of the genus *Nyctotherus* such as *N. cardiformis* a common intestinal parasite of the frog and the type species of the genus. The author reaches the conclusion that species of *Nyctotherus* are not truly entozoic parasites of man or indeed of any warm-blooded animal.

C M W

MORIOKA (Koichi) Experimental Studies on the Biological Behaviours of *Trichomonas hominis* (Davalne, 1860) Part II. Multiplication and Vitality of *Trichomonas hominis* in Various Culture Media. — *Tansuwan Igakkaï Zasshi* (Jl Med Assoc Formosa) 1938 Mar Vol. 37 No 3 (396) [In Japanese pp 504-513 [11 refs] English summary p 514]

Cultivation of *Trichomonas hominis* was attempted in a number of different media and it was found that that of Tanabe which did not encourage overgrowth with bacteria was the best.

C M W

TONIAS (José W) & NIÑO (Flavio L.) Estudio de una nueva observación de granuloma paracoccidoidal (Forma linfático-visceral.) [A Case of Paracoccidoidal Granuloma (Lymphatico-visceral Form).]—*Prensa Méd Argentina* 1935. Feb 2 & 9 Vol 25 Nos 5 & 6 pp 232-243 286-301 With 67 figs & 2 charts

The case described is a fatal one of generalized blastomycosis of the systemic lymphatic glands—axillary, inguinal, crural and abdominal—together with splenomegaly and involvement of the whole of the gastro-intestinal tract producing ulcerative and granulomatous lesions. The diagnosis was effected by the discovery of the organism, *Paracoccidioides brasiliensis* in an excised lymphatic gland. Infection was produced in the guinea pig by intratesticular inoculation, while cultures were obtained on Sabouraud's medium. No treatment was of any avail.

C M W

BLACKLOCK (D B) Presidential Address on Housing in the Tropics.—*Jl Roy San Inst* 1937 Nov Vol 58. No 5 pp. 296-303. With 2 figs [Summary appears also in *Bulletin of Hygiene*]

This address was delivered in the section of Tropical Hygiene at the Health Congress of the Royal Sanitary Institute at Birmingham in July 1937

Tropical housing is a subject which deserves more attention and investigation than it has hitherto received. Important considerations such as choice of site and orientation as regards sun and wind remain undecided, as also do such questions as materials and design and the application of new methods in ventilation and air-conditioning

Comfort in housing should at least include health factors. Essential considerations are the choice of site and the use of materials which will exclude as far as possible known vectors of human diseases. In Great Britain the word "vermin" in regard to housing usually refers to bugs, but in the tropics *Cimex* though commonly found, is of far less importance than many other arthropods

House diseases may be prevented by a proper selection of site and materials but much more than this is needed to secure comfort. Coolness may be obtained by an all-metal house such as the Nissen hut with an outer roof and verandah of thatch

The address concludes with a summary of the standards of overcrowding laid down in Great Britain by the Housing Act 1936 and these are compared with those of the Standard Oil Company and in Malaya and the Rand Mines. The author considers that a minimum floor space of 60 square feet per person, including children, for workers' houses in the tropics is a reasonable one.

The address was illustrated by a display in the Health Exhibition of photographs, plans and models of housing in a number of tropical colonies.

W H Peacock

ANDERSON (R E.) The Housing of Estate Coolies.—*Jl Malaya Branch Brit Med Assoc* 1937 Dec. Vol 1 No 3. pp. 268-274. With 1 fig [Summary appears also in *Bulletin of Hygiene*]

When Malaya was being opened up most of the coolies were unmarried and a barrack type of line and a communal life were most suitable. With development and stabilisation they brought their families with them. This necessitated the provision of individual or

semi-detached dwellings. Back-to-back lines are to be condemned and there should not be more than twelve rooms in a line. The cottage type is to be preferred. The size of room recommended is 12 ft. x 10 ft. with a minimum height of 10 ft. and this should accommodate three adults or a married couple with two children. It is usual to insist on window space equivalent to one-tenth of the floor-space. As windows are apt to be kept shut, fixed louvres or similar devices are necessary. Verandahs should not be enclosed.

For roofing material tiles are good but expensive. Corrugated iron is suitable if ceilings are provided. The use of aluminium foil as a heat insulator would give excellent results.

In the subsequent discussion the Controller of Labour preferred private plots to an open housing area, for which no individual could be held responsible. He recommended a semi-detached building with front and back verandah and a room 12 ft. x 16 ft. divided by a movable screen.

Dr B Barrowman said that in certain areas there was a definite association between concrete floors and increased tuberculosis rates. Unless there were damp-proofed dwarf walls concrete did not prevent the damp rising.

Estate housing should have a life of not more than fifteen to twenty years. New designs could then conform to new and better standards. Expensive permanent houses were to be deprecated for this reason.

W H Peacock

COUTO E SILVA (O B) Nota sobre a protecção da pele contra a luz solar pela pintura com Urucú (*Bixa orellana*) [Protection against Sunlight by painting with *Bixa orellana* — *Arquivos de Hig* 1937 Nov Vol. 7 No 2 pp 243-245 With 2 graphs. English summary (8 lines)]

In dogs exposed to direct sunlight the effect is shown by increased rate of respiration and in time by rise of temperature. In Brazil the Indians use amatto locally "urucú," a dye prepared from *Bixa orellana* for painting their bodies and this appears to reduce the effects of exposure to the sun's rays. The author exposed dogs to sunlight for periods up to an hour recording the respiration rate and the rectal temperature. Fig 1 is a graph of respiratory movements after 35 minutes exposure. He then painted them with urucú and after exposure for close upon an hour noted that the respiration rate was slower and there was less rise in temperature. Fig 2 shows the result after exposure for 58 minutes, and the respiration rate is clearly much slower. It is suggested that experiments might be undertaken to test whether the painting of dwellings with urucú would reduce the temperature within and add to comfort in the tropics. H. H S

SA (P) Study of Comfort Temperatures in Brazil. The Influence of Clothing.—*Estudos sobre o conforto termico e o conforto visual no Brasil Instituto Nacional de Technologia (Ministerio do Trabalho Industria e Commercio)* Rio de Janeiro 1936 pp 23-37 [Summary taken from *Dept. Scienc & Indust. Res Building Science Abstracts* 1938. Jan. Vol. 11 No 1 pp 31-32.]

"Using a Hill's kata-thermometer measurements were made of the dry-bulb temperature with a bare bulb as well as with a bulb covered with different textile fabrics it being assumed that the difference between the temperatures recorded by the bare and covered

bulbs would represent the degree of insulation provided by the fabric. It was found that the heat-insulating capacity of the materials is proportional to the kata temperature. The following values, in millicalories per cm<sup>2</sup> per second per kata degree, were obtained — Linen (white) 0.4 Cambrai linen (white) 1.5 cotton (white) 1.6 silk (white and red) 1.8 wool (blue) 1.9 It was also found that the degree of insulation varied for each material, as any given material might show lower values than another at a low kata temperature and higher at a higher kata temperature.

BALFOUR (Margaret) *The Training of Nurses Overseas and for Overseas Services.*—*Health & Empire* 1937 Dec. Vol. 12. No. 4 pp. 277-293.

The above paper was read by Dr Balfour at the Imperial Social Hygiene Congress held in July 1937. It deals with the training and conditions of service of local nurses in India and in the British colonies and dependencies. The information upon which the report is based was derived from the replies to a questionnaire sent out to the governments and also to certain organizations responsible for hospitals in the various countries.

The enquiry was concerned with such subjects as legislation controlling the training and practice of nurses, the standard of education demanded of candidates, whether Preliminary Training schools existed, whether Sister Tutors or Home Sisters were employed, the nature and length of the training being given, and the steps being taken to enable nurses, after completing their training, to make satisfactory use of their knowledge. Suggestions were invited as regards future developments in the training and organization of nurses.

Dr Balfour gives a résumé of the replies received and adds an interesting and useful commentary at the end of the report.

Common factors in the different countries which tend to retard the work are said to be the poor standard of education of the pupil nurses, the different outlook as regards family customs and religious beliefs, and the lack of public opinion on the value and dignity of nursing.

To help to overcome these difficulties the employment of Home-Sisters and Sister Tutors is considered necessary. Scholarships for locally trained nurses so that they could take post-certificate courses in England and grants to suitable hospitals to enable them to undertake the training of nurses are suggested.

Emphasis is laid on the importance of providing fair remuneration for trained nurses and of arranging satisfactory conditions of service after training. It is recommended that special committees on which the training-schools would be represented, should be appointed to deal with this important matter.

The author sums up: "Progress is needed in girls' education and more co-operation between educational and nursing authorities."

More care is needed in the organization of the training of nurses, apart from their service in hospitals.

The chief problems are how to develop in the pupil nurses a greater sense of responsibility and how to improve and safeguard their employment in the present conditions of society overseas.

The report is naturally difficult to summarize, being in itself mainly a summary, and it should be read in the original by all those interested in this matter.

M. G. Blacklock.

CAMERON (J A P) Estimation of Age in Asiatic Girls.—*Jl Malaya Branch Brit Med Assoc* 1938 June Vol. 2 No 1 pp 19-23  
With 12 figs. on 6 plates

The question so important in medico-legal proceedings as to whether a girl is 14 years of age or more cannot be answered correctly from the X-ray appearances of the bones in Asiatic girls in Penang. Mead's standard height weight tables and the appearances of the teeth are not accurate and the onset of menstruation though fairly constant at 12 to 14 years is not accurate enough for law. A clinical and X-ray investigation of 25 healthy Asiatic girls whose exact age was known from birth certificates led to the following conclusions—

"From this small piece of investigation it would appear that 2 years on an average should be subtracted from the European standards of ossification in the case of Asiatic girls.

If all the elbow epiphyses are ununited it is possible to say that an Asiatic girl is under fourteen years of age but if all the elbow epiphyses are fused it is impossible to say accurately whether the age is under fourteen or not. One has to take into consideration physical and sexual development and make an allowance for Asiatic development.

Onset of menstruation is a more accurate factor in age estimation than the height weight factor but of course is not accurate enough for medico-legal purposes. When there appears to be an endocrine deficiency as in case 23 an X-ray plate is helpful in confirming the diagnosis.

Details of the age estimations by different methods are given showing wide differences from the known actual age. C W

BASU (Sushil Kumar) & BASU (Sudhar) The Age-Order of Epiphyseal Union in Bengalee Girls. (A Preliminary Study)—*Jl Indian Med Assoc.* 1938 Aug Vol. 7 No 11 pp 571-578 [23 refs.]

The work described in this paper was undertaken in view of the importance for medico-legal purposes of the estimation of the age of Indian girls. Table 22 shows the ages at which the epiphyses unite with the diaphyses in the case of the majority of Bengalee girls

TABLE 22.

Epiphyses.	Age (in years) of union in majority of Bengalee Girls.
Proximal, humerus	16-17
Lateral epicondyle with shaft of humerus	12-13
Trochlea with shaft of humerus	12-13
Compound centre for lower epiphysis with shaft of humerus	12-13
Medial epicondyle of humerus	13-14
Proximal, radius	13-14
" ulnar	13-14
Distal, radius	16-17
" ulnar	16-17
Platform, centre present at	11 and upwards
Base first metacarpal	14
Distal phalanx, thumb	13-14
Head femur	13-14
Lesser trochanter femur	13
Greater trochanter femur	14
Distal, femur	18
Proximal, tibia	15-16
" fibula	16-17
Distal, tibia	14-15
" fibula	15
Apophysis calcaneus	14-15

The findings are based on the radiological examination of 190 girls, which entailed the taking of 1,300 skiagrams. The girls were chiefly from middle-class families living on a mixed diet and were in normal health. Careful scrutiny of birth records was made. The authors point out certain discrepancies between their findings and those of GALSTAUM recently published.

[The figures in Table 22 are only majority figures.] Reference to the more detailed tables in the article shows that considerable variation in the time of union is observed. Table 17 for instance, shows that in the case of an individual person an exact estimate is not possible.

TABLE 17  
*Proximal Epiphysis of Tibia.*

Age	No. of cases	No. of fusion	Percentage of fusion
9	1	Nil	0
10	2	Nil	0
11	4	Nil	0
12	10	Nil	0
13	21	4	19.5
14	24	12	50
15	13	9	69.2
16	18	17	94.4
17	12	10	83.3
18	3	3	100
19	3	3	100

[See also CAMERON above.]

TRÉFOUIL (J) De la chimiothérapie anti-protozoaires à la chimiothérapie anti-bactérienne [From Antiprotozoal to Antibacterial Chemotherapy]—*Bull Inst Pasteur* 1938 Apr 30 Vol. 36. No 8 pp 395-410. With 1 fig.

The author indicates how chemotherapy in protozoal diseases had made advances long before success was achieved in bacterial diseases. Trypanosome infections in mice had allowed LIGNARD to experiment with arsenious acid in 1883. EHRLICH & SHIGA (1904) used dyes and found that trypan red alone of these killed the parasite and not the host. The latter discovery was a big step forward and the idea of a chemotherapeutic index and specificity of action took shape. EHRLICH established the formula for atoxyl already prepared, and showed how slight structural changes modified activity. The preparation of 606 followed in 1909. FOURAUEAU has contributed much in this field and indicated many general rules regarding drug action. In antimony as well as in arsenic compounds there is a marked specificity of action, and it is shown also in Bayer 205 which is rendered inactive by the change in position of one methyl group. The latter was the first drug giving rise to immunity over a period of months. Bacterial chemotherapy had lagged behind due to lack of test methods with animals. MORGENTHAU early used optochin against pneumococci. The introduction of Prontosil (and later Prontosil S) by DOMAGK in 1935 against streptococcal infection in mice marked a new era. He worked on the

idea of a basic dye with an azo grouping. Other workers had earlier almost reached the same goal but failed for lack of test methods.

The author and co-workers have obtained active compounds by the introduction of different substituents to the prontosil molecule. It seemed that prontosil might readily be broken down at the azo bond to its components in the body and in fact paraaminophenyl sulphonamide (F1162) isolated from the blood and urine after treatment with prontosil, proved as active as the original. It has been shown, moreover that the triaminobenzene to which the drug could at the same time give rise causes sensitization in the allergic phenomena following prontosil treatment in the guinea-pig. F1162 is structurally the same as atoxyl and stibamine with a sulphur atom replacing As. and Sb respectively. All variations of F1162 have proved less active than the original and the sulphonamide group must be present for activity. Derivatives with the sulphur atom in different states of oxidation showed that sulphones are most effective. Definite advances in bacterial chemotherapy have resulted from the study of these sulphur compounds. Details of experiments with streptococcal infection in mice using F1162 and other compounds are given and the former is claimed as superior to prontosil. The results are supported by workers in other countries. F1162 has an action against the meningococcus Type III pneumococcus staphylococcus and in typhoid aertrycke, Pasteurella tubercle coli and gonococcal infections. Treatment of a gonococcal tox infection in mice has demonstrated the value of certain related sulphones and sulfoxides. Given by mouth F1162 diffuses rapidly and its rate of elimination has been determined. It can readily be estimated colorimetrically in urine after diazotization and coupling with dimethylammonaphthylamine with which it gives a red violet colour. It increases markedly the bactericidal power of blood and body tissues and is active *in vitro* against moulds streptococci, pneumococci gonococci and meningococci. There is a striking parallel between its *in vivo* and *in vitro* activity. The azo derivatives of this compound are inactive *in vitro* but addition of cysteine makes them active, like reduction in the body.

The body resistance lasts only when the drug is present and on elimination the animal is again subject to reinfection. The facts point to a direct action on bacteria by the drug and the possible mechanism of such action is discussed. Splenectomy blocking of the reticulo-endothelial system or avitaminosis do not prevent it from acting. A list of trade names and origins under which F1162 is known is given.

J. D. Fulton

GODART (Justin). Quelques observations faites au cours d'une mission aux Indes françaises et en Indochine. [Observations made during a Mission to the French Indies and Indo-China.]—*Bull Acad Med* 1938 Mar 22. 102nd Year 3rd Ser Vol. 119 No 12. pp. 342-347

FINDLAY (G. M.) Immunization against Diseases in the Tropics.—Reprinted from *Practitioner* 1937 Vol. 139 pp 105-114 [39 refs.]



## REVIEWS AND NOTICES.

EVANS (Alwen M.) [D.Sc. Manch.] Mosquitoes of the Ethiopian Region. II.—Anophelini. Adults and Early Stages.—pp x+404 With 174 figs [6 pages of refs.] 1938. London British Museum (Natural History) Cromwell Road, S.W. 7 [£1]

It will be remembered that an extremely valuable series of monographs on the mosquitoes of Africa south of the Sahara is being published by the British Museum. The first volume by Hopkins, dealt with the early stages of the Culicines (see this *Bulletin* 1936 Vol. 33 p. 570) the second, dealing with the Anophelini is now before us. It was only a few days before her death that the authoress came to London with the manuscript of this monograph and her friends must draw what satisfaction they can from knowing that she brought her valuable work almost to completion. It remained for Dr F. W. Edwards to insert a few paragraphs and the descriptions of three new species of *Anopheles*, which were included in a remarkable collection received by the British Museum from the Congo in 1937. But essentially the work is Miss Evans's, illustrated mainly with her drawings, the rather solid text occasionally lit up by a few unexpected words recording some personal recollection.

The general introduction includes a full, well illustrated account of the anatomy of the adult and early stages—this is extremely well done and concludes with practical notes on methods of making special examinations. The genus *Anopheles* is split up into a somewhat elaborate series of lesser units: subgenera, groups and sub-groups, which adds considerably to the reader's burden, particularly as some of the names, for instance *Afzowynia* may indicate either a subgenus or a group. The writer must therefore continually explain the sense in which such a word is used. The procedure might however be justified on the ground that it makes the relation of the species to one another clearer. The book deals with 60 species and 21 varieties, and one observes that the larvae of all of these except 11 species and 5 varieties are known and described. This is remarkable particularly as many of the species are only known from a single locality and a very few specimens (which, incidentally makes it clear how much more work—even of a preliminary nature, is still necessary). The key to the adults is based on characters shown by the females. It includes page references to illustrations of some of the characters, an admirable point. There is also a short key to the adults of those species which are likely to occur in houses and a key to the known larvae, but none to the eggs. One important misprint has been detected, and the Editor asks us to call attention to it. In the key to adults on page 46 the figures 8 and 5 in the right margin should be transposed. This small error invalidates a considerable part of the key.

In the systematic part of the book the treatment of each species is full and very little has been omitted. After dealing with synonymy and the present location of the type the adult insect is described. A series of figures deals not only with external characters, but also with the pharynx and the terminalia of the male. Descriptions of early stages follow several of them being here described for the first time. In the section devoted to the biology of each species an account is given of breeding places, the habits of the adult and its relation to

malaria. The geographical description is given in full with many quotations from workers in the field many old records which could not certainly be attributed to particular species (as now defined) have been discarded. In the section dealing with *Anopheles funestus marshalli* and *rhodesiensis* a very full account of the synonymy and points of difference is given.

The book will be of great value to the Medical Officer of Health. With the general knowledge which he has probably acquired in a school of tropical medicine he will now be able to learn to distinguish his local species both as adults and larvae. (Local keys would now be easy to make and would be very valuable for certain parts of Africa for which none is at present available) As to the two main transmitters of Africa *gambiae* and *funestus* the malarologist will find himself provided with very full information (30 pages or so). He will also find paragraphs which give group characters for larvae using this it will at least be possible to say either that a particular larva is or is not that of *gambiae* its precise identification if not *gambiae* being left vague. One should, however remember that 5 or 6 other species are already known to transmit malaria in some part of Africa and it is now no longer justifiable to assume that *gambiae* and *funestus* are the only important carriers. Experience in India in the last 20 years has surely taught us the need of determining in each separate area which species are actually transmitting.

The subject of control is not dealt with except in so far as it may be deduced from the biology of the species.

For reasons which we have just given the book will appeal to the specialist. The general zoologist might also find much of value in it. He is beginning to show increasing interest in biological races and other groups within the limits of species modern intensive work on *Anopheles* produces a great deal which is of general interest. The well-informed zoologist will remark on the almost complete absence of any laboratory work of a modern kind. What has been done in the field seems to have set the stage for critical laboratory work which is at present lacking.

There can be no doubt that the volume before us will greatly facilitate work on the *Anopheles* of tropical Africa. For many years it will remain a standard work and if it rapidly becomes out of date in matters of detail that will be evidence of its stimulating effect on investigations in Africa.

P A Buxton

NEVEU-LEMAIRE (M) [Professeur Agrégé des Facultés de Médecine]  
*Traité d'entomologie médicale et vétérinaire.* [Treatise on Entomology Medical and Veterinary]—pp xxvii+1339 With 597 figs. 1938 Paris Vigot Frères Éditeurs 23 Rue de l'École-de-Médecine. [Bound Fr 280 Unbound Fr 250]

The writer of a book on medical and veterinary entomology may arrange his subject matter in diverse ways. His plan may be comprehensive including all insects which have any relation (even the remotest rarest or most accidental) to medicine or it may be eclectic the author choosing to develop such parts of the subject as seem to him to be important or interesting. Moreover the author's point of view might incline to medicine or to zoology and the zoologist's interest might be systematic or biological.

The author of the present book has preferred to be comprehensive and zoological—his arrangement is (mainly) systematic. After about a hundred pages dealing with general topics (parasitism in Arthropoda arthropods which are venomous and those which have culinary or therapeutic value etc.) he passes to a systematic discussion of the subject, dividing it by classes orders families and so forth. This occupies 1100 pages. The book is concluded with a list of mammals and birds with their parasites followed by a list of parasites (arranged taxonomically) and their arthropod hosts or vectors.

This arrangement gives the book certain definite merits. One can, for instance at once turn up a list of ticks recorded from the African elephant or find the name of the flea of the polecat the louse of the yak, the bot of Chapman's zebra, or the feather mite of the ostrich. ("Veterinary Entomology" has been interpreted largely and generously.) Similarly one may inform oneself quickly and easily that there are two records of spring-tails (Collembola) occurring in great numbers on the human skin, and one record of a child swallowing larvae of a skip-jack (a beetle of the family Elateridae).

There are however certain disadvantages in the author's plan. He has felt impelled to include a number of forms of life which are hardly relevant. For instance half a page and a figure are given to the "water flea" (*Daphnia pulex*) on the ground that it is an intermediate host of certain worms occurring in ducks and swans—and being a logical man, the author has to precede this entry with a few lines on the anatomical character of the genus *Daphnia* the subfamily Daphniinae, and the family Daphnidae. In contrast *Venopville chropis* receives only two pages to cover not only the anatomy and biology of this very important insect but also its relation to plague and to murine typhus. The reader will therefore regret that so much space is given to rarities and creatures which are on or even beyond the borderline of the subject, and may feel that the information on the principal insects of medical importance is short and imperfect. Occasional errors have crept into the text, in spite of the author's very great knowledge of the subject. There is for instance a confusion between the screw-worm fly of America, *Chrysomya hominivorax* (exclusively parasitic and of great veterinary importance) and the quite distinct *C. macellaria* (breeding only in carcasses). The statement that we are ignorant of the pathogenic importance of *Phlebotomus murinus* might mislead, for it is almost certainly an insect which sucks reptiles and nothing else.

The text includes several excellent maps of geographical distribution of biting insects.

P. A. Buxton

Niño (Flavio L.) Contribución al estudio de las blastomycosis en la República Argentina. (Revisión de las blastomycosis observadas en el país y estudio de nuevas observaciones.) (Blastomycosis in the Argentine Republic.—*Boletín Inst. Clin. Quirúrg.* Buenos Aires, 1938. July. Vol. 14. No. 117. pp. 591-1042. With 271 figs. 61 plates 15 charts & 1 map. 7519 refs. English summary.)

The whole of this issue of the *Boletín* 450 pages, is given up to a study by Professor Flavio Niño of Blastomycosis in the Argentine in particular as designated in the subtitle a review of blastomycosis and an account of new observations on the disease in the country. It would have been worth publishing as a separate book or as a special

number rather than as a routine issue of the University's *Bulletin* since it is practically a monograph on a subject of great interest not only in the Argentine but in other warm climates also. The work is described in thirteen chapters the last of which contains the summary. We can do little more here than indicate the scope of the study. Chapter I deals with generalities and the author's classification into three main groups each of which is dealt with in detail subsequently. Next follows a brief historical section. Chapters III and IV are concerned with Group I the Blastomycoses proper describing the strains found in the Argentine with a key to their classification and identification and illustrative cases of infection by them. Plates are reproduced showing the growth characteristics on artificial media and their microscopic appearances. Among this group is placed cryptococcal granuloma and experiments are recorded of the results of inoculation of cultures into rats and rabbits. The ensuing three chapters VI-VIII describe Group II or Parablastomycoses and this term includes paracoccidioides granulomata Gilchrist's systemic blastomycosis of North America this was first studied by Gilchrist in 1894 and noted to differ from granuloma associated with Coccidioides. In this group also is placed Darling's Histoplasmosis or systemic parasitic reticulo-histiocytosis. Group III described in the next three chapters, is that of the Pseudoblastomycoses and includes Posada's disease or coccidioidal granuloma, Rhinosporidiosis seeberi and the chromomycotic granulomata—*Phialophora verrucosa* and *Hormodendron* (or *Acrotheca*) *pedrosoi*—which have repeatedly received mention in this *Bulletin*. The twelfth chapter describes shortly the geographical distribution of Blastomycosis in the Argentine. The whole is copiously illustrated by 61 plates and 271 figures and photomicrographs, several of the former being in colour. This monograph will doubtless hold its place as the standard work of reference on the subject for a long time. H H S

GIORDANO (Mariano) [Colonnello Medico della R. Marina. Libero Docente in Patologia Coloniale.] *Medicina ed Igiene Coloniale. Ad Uso degli Ufficiali, Funzionari Coloniali, Militari di Sanità, Infermieri, Missionari, ecc.* [Medicine and Tropical Hygiene.] Second Edition revised and enlarged.—pp xii+626 With 1 folding map & 204 figs. (8 coloured) 1939 Milan Ulrico Hoepli. [Lire 24]

In a preliminary puff by the editor is the statement that this book by its simplicity of exposition its clarity and the care taken to set forth the chief features of conditions and diseases in the tropics will specially appeal to nurses Red Cross officials sanitary officers and missionaries.

The remarks made in the review of the first edition in 1930 [this *Bulletin* 1930 Vol. 27 p 862] are just as applicable to this new issue. It is eminently readable the diction is easy clear and straightforward the illustrations are, with few exceptions remarkably good but as was said before it is difficult to place the work. It contains far too much for the layman and omits far too much for the medically trained. This second edition is longer by 71 pages and contains 74 more figures than the first, but a thinner paper has been used and the size of the book remains unchanged and as handy as before. Forty pages of the increase have been inserted in the first chapter dealing with the structure and functions of the human body. Presuming that the work

is aimed to serve the more educated and responsible non-medical official. Illustrations will prove a greater help than letterpress and the fact that for example leprosy now has 3½ pages of description and 9 figures in place of 3 pages and 4 figures is explained and justified. The treatment of cholera occupies 11 lines and is said to be symptomatic by means of laudanum, stimulants, warm baths, and large enemata—nothing is said of hypertonic salines. Inequalities which are not easy to explain are many—for example, tabardillo (Mexican typhus) has five lines, fièvre boutonneuse six, while a whole page is given to murine typhus. Again, for a work on Colonial Medicine and Hygiene two lines seem inadequate for preventive vaccination against plague. The advances in treatment of malaria—the use of plasmoquine and atebm—are brought up to date. Illustrations of African trypanosomiasis have been increased from 10 to 18 and on the whole are very well reproduced—the error or at least the unproven statement that there is a gouty form of chronic Chagas disease is left uncorrected. The transmitter of yellow fever goes under the name *Stegomyia fasciata* though it is true, *Aedes aegypti* does receive casual mention as a synonym or alternative.

Certain alterations have been made in the arranging of subsections for which it is not easy to account. Thus worms in the former edition was placed in the section of diseases transmitted by animals, now we find it under diseases of cutaneous or transcutaneous origin, and under the same head come glanders, anthrax and meloidosis, while malaria, kala azar three- five- and seven-day fever and yellow fever are included under diseases transmitted by animals, and Weil's disease among those transmitted by water or food. Man is said to be a possible intermediate host of *T. saginata* and *Cysticercus bovis* is said to infest man. Inequality of treatment is exemplified in 22 lines being given to *F. bancrofti* twice that to *Dracunculus*, 23 to beriberi, 24 to scurvy and 10 each to pellagra and sprue (which is described as "probably an intestinal infection caused by Monilia").

The work is very comprehensive and deals, in addition to the diseases of warm climates with emergencies, poisoning and its treatment, artificial respiration, surgical instruments needed or used in major or minor operations—the microscope, laboratory examinations and entomological technique are described, and there are sections treating of disinfection, quarantine and sanitary legislation, and in conclusion a vocabulary of the more common terms used in medicine and their definition, such as abrasion, agar albumen, alkaline borborygmi, boursous, Bunsen burner germ, laxative obesity prognosis prophylaxis, protom, punkah—a strange mixture. In conclusion, let us repeat, the work is handy truly a pocket manual, is well printed and well illustrated, imparts much useful information to the layman and affords the medical man food for thought.

H H S

HANLEY Baron [G.C.S.I. G.C.I.E.] *An African Survey. A Study of Problems arising in Africa South of the Sahara.* Issued by the Committee of the African Research Survey under the Auspices of the Royal Institute of International Affairs—pp. xxviii+1837 With 6 maps (3 coloured) 1939. London New York Toronto Humphrey Milford, Oxford University Press [21s.]

The chapter on health in this comprehensive survey of African conditions is divided into sections. Section 1 deals with the early medical work undertaken by Europeans and pays tribute to the

humanitarian activities of the missionaries from the eighteenth century onwards who brought European medicine to the Africans. Section 2 gives short accounts of the principal diseases in Africa and indicates the general lines on which control is attempted. Section 3 deals with the international organizations concerned with health and sections 4 to 7 indicate the organizations and policies adopted in British French Belgian and Portuguese territories. The conditions in British territories vary considerably between those in the Union, with its comparatively highly developed industrial life and those in the remoter parts of East and West Africa. As is perhaps to be expected the facilities for training in tropical medicine are better in England than in the other countries named.

Section 8 is concerned with the medical education of Africans and section 9 with the health policies of the various governments.

The chapter on health will appeal to those whose duty it is to co-ordinate all the activities of government. The exposition is lucid without being dogmatic and the problems are set out briefly but clearly. Advantage has been taken as may be seen by references in footnotes, of much recent literature on the diseases discussed. It consists largely of a statement comparative account and criticism of the medical policies adopted by the various governments. To medical men it will be interesting in that it discusses the methods adopted by the French Belgians and Portuguese. Beyond that there is little that is not known by those who practise in Africa.

Lord Hailey while recognizing the value of arguments for and against criticizes the expenditure of money on British hospitals. He thinks that except in those designed for teaching purposes too much may have been spent on them and that the money might have been used more advantageously in providing facilities of a simpler type spread over larger areas. He states that "disease of the type which causes most mischief in Africa is generally a mass affliction, and must be attacked in the mass. It cannot be denied that many diseases are more successfully attacked by sanitary measures and education, which can only be successfully undertaken by widespread approach to the natives in their own districts but since successful persuasion of uneducated peoples depends so largely upon their faith in their instructors and since that faith, in medicine is most easily and thoroughly encouraged by the experience of the cure of disease there must be a balance between curative and preventive medicine and in the early stages the former should be given precedence. Africa does not yet possess sufficient medical facilities to satisfy conscientious clinicians and to attempt to set a lower standard of these in hospitals so as to further a more widespread but less exact method of dealing with the mass of the people is not a project that will appeal to some of those who see not only the immediate results of their work on individuals but also the effect of that work on whole populations. There is much to be said for efficient modern hospitals to which outlying dispensaries can refer their cases. The diseases from which Africans suffer are by no means all tropical diseases.

The section on health education stresses perhaps the most important aspect of the attack on disease. The most difficult problem of the health services does not however lie in enforcing anti-epidemic measures but in persuading Africans to adopt the recognized principles of hygiene as part of their social habit. The sanitary services must now undertake an education in health matters which will replace

the advice given by native practitioners and also many of the prescriptions of African custom. Nobody can criticize that conclusion, but it could with advantage be added that the education should be standardized and be conducted on a definite plan.

In chapter 24 a proposal is made that a sum of money should be spent annually on research in all departments and that this should be administered by a committee of the Privy Council or other body and that a bureau for the collection and distribution of knowledge concerning Africa should be instituted. There is no doubt that the first suggestion would lead to greatly increased efficiency but from the point of view of medical work, it would seem preferable to conduct research through an organization which would include the whole of the Colonial Empire rather than be confined to Africa. With regard to medicine the second suggestion is already dealt with by the Bureau of Hygiene and Tropical Diseases.

The book as a whole is a unique production and should be read by all interested in African problems. A survey of Africa is a massive project which could only be carried through with the help of considerable numbers of people. The extent to which Lord Hailey has availed himself of these is seen in the list of acknowledgments at the end. Omissions and errors are inevitable but may be corrected in future editions. For instance on page 1128 in the account of preventive inoculation against yellow fever no mention is made of the pioneer work of HIXDLE and (independently) ARAGÃO in 1928 which did so much to make vaccination possible. Another example occurs on page 1618 in which the Bureau of Hygiene and Tropical Diseases is stated to be supported by the Colonial Office and to have issued the *Tropical Diseases Bulletin* since 1931. Actually the Bureau is supported by a Parliamentary Grant in Aid and by contributions from the Governments of the various Dominions, Colonies, Protectorates and Indian Provinces and from the Indian Research Fund Association, and has issued the *Tropical Diseases Bulletin* from 1912 and the *Bulletin of Hygiene* from 1926, up to the present time. Both Bulletins are increasingly demanded by workers at home and abroad.

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Am. signifies Amoebiasis and Amoebic  
Dysentery

Bl.	Blackwater
B.R.	Book Review
Chl.	Cholera
Der.	Tropical Dermatology
Diet.	Deficiency Diseases
Dys.	Dysentery (Bacillary and Unclassed)
Fev.	Fevers
Hel.	Helminthiasis
Leish.	Leishmaniasis
Lep.	Leprosy
Lept.	Leptospirosis

Mal. signifies Malaria.

Misc.	Miscellaneous
Oph.	Tropical Ophthalmology
Pl.	Plague
Rab.	Rabies
R.B.F.	Rat Bite Fever
Rep.	Medical and Sanitary Reports
R.F.	Relapsing Fever and other Spirochaetoses
Sp.	Sprue
Tryp.	Trypanosomiasis
Vms.	Venoms and Antivenoms
Y.F.	Yellow Fever

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 Canova, F. 812 (Mal)  
 Cardoso H., with Cole 296 (Lep)  
 Cardoso A. with Maza & Basso 654 (Mal)  
 Cardoso, W. W. 453 (Misc)  
 Carry L. S. & Duncanson, G. G. 801 (Fev)  
 Carman, J. A. 787 (Pi)  
 Carpano M. 80 (Der)  
 Carr H. P., 800 (Mal)  
 — with Boyd & Roseboom, 659 (Mal)  
 Carriere, C. with Dureau & Arqued 499 (R.P.)  
 — with Pelther Jouchere & Arqued, 780 (Fev)  
 Carrón, A. L. 836 (Misc)  
 Carter, J. C. with Stratsman-Thomas & Barber 257 (Mal)  
 Cartolari, C., with Tarabam-Castellani, 435 (Vms)  
 Casini, G. 77 (Mal)  
 Castaneda, M. R., 369 (Fev)  
 — & Vargas Carrel, J. 797 (Fev)  
 Castellani, A. 53 (Sp) 225 (Hel) 628 (B.R.)  
 — & Jacono, I. 327 & 328 (Tryp)  
 Castellani L., 819 (Misc)  
 Castellanos, A. 688 (Diet)  
 Castillon, T. J. E. L. 177 (Lash)  
 Castle, W. B. & Deland, G. A., 431 (Bi)  
 Castro G. de O. with Chagas, da Cunha Ferreira & Romafia, 873 (Lash)  
 Catanes, A. 91 (Der)  
 — with Foley & Parrot, 91 (Der)  
 — with Parrot, 810 (Mal)  
 — with — Ambasket & Claesner 422 (Mal)  
 Cawston, F. G. (269) (270) 569 (369) (800) 88 (Hel)  
 Casanova F. 436 (A.F.)  
 Cream, E. & Boquet, P. 435 (Vms)  
 Ceylon, 317 (Rap)  
 Chagas, A. W. with Chagas, 874 (Lash)

- Chagas, I. & Chagas, A. W. 874 (Lash)  
 — da Cunha, A. M. Castro, G. de O. Ferreira, L. C. & Romafia, C. 873 (Lash)  
 — & Romafia, C. 178 (Lash)  
 Chakrasarti, D. N. & Tyagi, N., 443 (Misc)  
 Chambooleyron E. J., with Maza, Basso, G. & Basso R. 721 (Tryp)  
 Chandler A. C. 380 & (Hel)  
 Chang, J. H. M. with Chung, 783 (Fev)  
 Chang, S.-L. with Hsieh & Yang, 382 (Fev)  
 Chang, T. L. 197 (Mal)  
 Changyots N. with Lotando & Chorefta, 728 (Mal)  
 Chapurakaya-Bagenova, N. A., Lertman, M. Z. & Fialkovskaya, L. P. 135 (Am)  
 Chatterjee H. N. with Basso, 451 (Misc)  
 Chatterji, S. N. 290 (Lep) 780 (Hel)  
 — with Lowe, 297 (549) (Lep)  
 Chaudhuri, M. N. R. with Napier & Chaudhuri, M. N. 181 (Lash)  
 Chaudhuri, R. N. with Napier & Chaudhuri, M. N. R. 181 (Lash)  
 — with — Das Gupta, Sen Ral Chaudhuri Sen Gupta & Majumder 848 (Misc)  
 Chaves, J. 874 (Hel)  
 Chelareicu, M., with Cruca, Baluf Isaac & Glaser 26 32 (Mal)  
 — — — Lavrenko & Zotta, 428 (Mal)  
 Chellappa, S. I. & Jacobs, W. P., 842 (B.R.)  
 Chen, H. T. 594 (Hel)  
 Chertman, C. C. & Ladgona, P. 170 (Rab)  
 Chi, T.-C. & Shu, D. L. 769 (Fev)  
 Chien, B. 842 (Rab)  
 Chin, K. 519 (Vms)  
 Chin, Y. T. with Feng, 191 (Mal)  
 Chinnayev P. P., (134) (Mal)  
 Chitra, G. D. with Sokhey 204 (Pi)  
 Chiodova, J. & Schlosova, M. 36 (Mal)  
 de Choisy H. 782 (Hel)  
 Chopra, R. N. 778 (B.R.) 818 & 819 (Misc)  
 — & Basso, B. C., 598 (Mal)  
 — & Chowhan, J. S. 520 (Vms)  
 — Das, N. N. & Mukherjee, S. N. 313 (Diet)  
 — & Das Gupta, B. M. 800 (Mal)  
 — with — 129 (Lep)  
 — Hayter R. T. M. & Sen, B. 30 (Mal)  
 — Mukherjee, S. N. & Chowhan, J. S. 437 (Vms)  
 — & Roy A. C. 570 (Mal)  
 Chorefta, P. with Lotando & Chamots 728 (Mal)  
 Choupe, V. 730 (Mal)  
 — & Berry P. 301 892 (Lep)  
 — with Bramp, 103 (Mal)  
 — with Marchoux, 297 892 & 893 (Lep)  
 — with — & Koechin, 301 (Lep)  
 Chou, T. Q. with Mee, 837 (Misc)  
 Chowhan, J. S. with Chopra, 820 (Vms)  
 — with — & Mukherjee 437 (Vms)  
 Christophers, R. 163 (B.R.)  
 Christophers, S. R. & Fulton, J. D. 709 (Tryp)  
 — with — 711 (Tryp)  
 Chu, C. F. 288 (Hel)

- Chu T. C., with Andrews, 509 (Mal.)  
 — with McCoy 221 (Hel.)  
 Chung H. L., 499 501 bis (R.F.)  
 — & Chang J. H. M., 783 (Fev)  
 Ciocchitto, A. M., 149 (Misc.)  
 — & Ciocchitto E., (276) (Hel.)  
 Ciocchitto E., 267 (Hel.)  
 Ciento, R., 287 (Lep.)  
 Cimino V., 276 (Hel.)  
 Clotola, E., 333 (Tryp.) 864 bis (Leish.)  
 Cipriano L., 670 (Hel.)  
 Cito V., with Monaco & Mangiacapra, 565 (Mal.)  
 Cima, M., Balil, L. Chelarescu, M., Isanos M. & Glaser L., 26 32 (Mal.)  
 — Chelarescu, M., Lavrenko M. & Zotta, E., 428 (Mal.)  
 — Baltescu I. & Alexa, I., with Baltescu, R., Boeru V. & Radanov A., 899 (Mal.)  
 — Tomescu, P. & Hadenski, G. with Radenski, A., Ionescu P. & Tersteanu, M., 428 (Mal.)  
 Clark, A., 72 (Misc.) 691 (Diet.)  
 Clark, H. C. (571) (Mal.) 823 (Misc.)  
 — & Kemp W. H. W., 806 (Mal.)  
 Clastrier J., with Parrot, Catanes & Ambialet, 422 (Mal.)  
 Cleland, J. B., with Black, 822 (Misc.)  
 Clitandre, S. with Montestruc & Germain, 362 (Fev.)  
 Clough, M. C. with Stitt & Clough, P. W. 407 (B.R.)  
 Clouston, T. M., 291 (Lep.)  
 Clow A. D., with Webster 168 (Rab.)  
 Cochaux, L., 669 (Hel.)  
 Cochrane E., 824 (Misc.)  
 Cochrane, R. G. & Rajagopalan, G. 883 (Lep.)  
 — with Wade & Raj 547 (Lep.)  
 Cockell, W. C., 280 (Hel.)  
 Coggeshall, L. T., 109 897 (Mal.)  
 — & Krumm, H. W., 109 (Mal.)  
 Cohen, A. & King, H., 515 (Mal.)  
 Colas-Belcour, J., with Roubaud & Stefanopoulou, 117 (Y.F.)  
 — with — & Treillard, 571 (Mal.)  
 Cole, H. L. & Cardoso H., 296 (Lep.)  
 Cole, A. C., 378 (Fev.)  
 Collignon, E., 261 (Mal.)  
 Colonial Office, 438 (Misc.)  
 Commandon, J. & de Fombrune P., 921 (Misc.)  
 Comsa, G. & Bruckner L., 513 (Mal.)  
 Connell W. K., 696 (B.R.)  
 Connor C. L. with Meyer Smyth & Eddie 212 (Pl.)  
 Constantinesco N., with Baltescu, (372) (Fev.)  
 Concernis E., with Dubois, Dupont & Degotte, 290 (Lep.)  
 Cooley R. A., with Parker Philip & Davis 147 (Misc.)  
 de Cooman, E., with de Waele, 804 (Hel.)  
 Cooper C., with Spies & Blankenhorn, 690 (Diet.)  
 Cordero, V., 79 (Misc.)  
 Cornelison, D. A., with Merincescu, Lazar & Bosila, 422 (Mal.)  
 Cornet, E., 856 (Oph.)  
 Conradettil, A., 89 428 573 809 817 (Mal.) 438 (Misc.)  
 Corréa, R., with Galvão & Lane 571 (Mal.)  
 Corson, J. F., 333 339 (Tryp.)  
 Cossio A., 444 (Misc.)  
 de Congur with Polinsco 865 (Leish.)  
 Coeto e Silva, O. B., 925 (Misc.)  
 Covell G., 193 bis 416 724 (Mal.)  
 — Mulligan, H. W. & Afridi, M. K., 901 (Mal.)  
 Craig C. F. 420 (Mal.) 583 (Vra.)  
 Gram, E. B. Jones, M. F., Reardon, L. & Nolan, M. O. 382 (Hel.)  
 — with Wright, 678 (Hel.)  
 Cranford-Benson, H. J. 920 (Misc.)  
 Crenn R., 593 (Hel.)  
 Cross E., with Spies & Samad, 686 (Diet.)  
 Crowder J. A. with Anderson & Reeves, 294 (Lep.)  
 Crozalou, C., 478 (B.R.)  
 Cruckshank, M. M. 185 (Leish.)  
 Cruveilhier L., with Nicolau & Hopciowara 169 bis (Rab.)  
 — & Viola, C. 170 174 (Rab.)  
 Cruz, E., with Walcott, Paobello & Serafim, 115 (Y.F.)  
 Cumming H. S., 493 (Y.F.) 753 (Pl.) 779 (Fev.)  
 da Cunha, A. M., 866 875 bis (Leish.)  
 — with Chagas Castro Ferreira & Romafia, 873 (Leish.)  
 Carasson, G. 331 (Tryp.)  
 — Sawoko B. & Laurence 871 (Leish.)  
 Cutler J. W., Park, F. R. & Herr B. S., 843 (Misc.)  
 Cyprus 257 (Mal.) 614 (Rep.)

## D

- Dacie J. V. Israëls M. C. G. & Wilkinson, J. F., 482 (BL)  
 Dahr P., 130 (Lept.)  
 — & Hagemann, P., 47 (Sp.)  
 Daland, G. A., with Castle, 481 (BL)  
 Dalgamouni, M. A. K., 538 (Lep.)  
 Dammig, G. J., 602 (Hel.)  
 Dangerfield, W. G., Gaunt, W. E. & Wormald A., 714 (Tryp.)  
 Danglemont, F., with Jolly 505 (Lept.)  
 Dang Van-Ngu, with Gailhard & Phan-Huy Quat, 267 (Hel.)  
 Dann, W. J., 684 (Diet.)  
 Daa, V. N., with Chopra & Mukherjee 313 (Diet.)  
 Das Gupta, B. M., 508 bis (R.B.F.) 732 (Mal.)  
 — & Chopra, R. N., 129 (Lept.)  
 — with Chopra, 900 (Mal.)  
 Das Gupta, C. R., with Vapier 82 (Misc.)  
 — with — Chaudhuri, Sen, Rai Chaudhuri, Sen Gupta & Majumder 846 (Misc.)  
 Dassanayake, W. L. P., 759 (Hel.)  
 Dauer C. C. & Faust, E. C., 20 (Mal.)  
 Davey T. F., 882 (Lep.)  
 Davies, I. G., with Gray & Peters 788 (Fev.)  
 Davis G. E., with Parker Philip & Cooley 147 (Misc.)

- Davis, M. C., with Soper, Beechkes & Kerr 496 (Y.F.)  
 Davis, W. T., 414 (Oph.)  
 De M. N. with Tribedi, 578 (Am.)  
 De N. K. 890 (Lep.)  
 — with Lowe 556 (Lep.)  
 De S. S. with Gboah, 430 (Vms.)  
 Deane L., 873 (Lenth.)  
 — & Deane G. 184 (Lenth.)  
 Decourt, P. 511 896 (Mal.)  
 Degotte, J. with Dubois, Dupont & Coenraets, 280 (Lep.)  
 De la Barrera, J. M. 211 (Pl.)  
 De la Warr 86 (B.R.)  
 Delbove, P. 365 (Fev.)  
 — with Alain, 781 (Fev.)  
 — Caset, J. & Troong Van-Huan, 780 (Fev.)  
 — & Nguyen-Van-Hoang, 384 785 (Fev.)  
 — with Hagnot, Alain & Caset, 783 (Fev.)  
 Del Verchao, P. 636 (Misc.)  
 Denison, G. A. McAlpine J. G. & Gell, D. G. 174 (Rab.)  
 Dennis E. W. & Land, E. L. 577 (Am.)  
 Depreco, with Boussene-Lacroix & Trausac, 653 (Lenth.)  
 Detrick, E. H. 62 (Misc.)  
 Dechamps, R. 580, 584 (Am.)  
 Deinos, with Buren, 117 (Y.F.)  
 Desportes, C. 678 (Hel.)  
 Destribats, with Sanner 544 (Am.)  
 Desvergne, 906 (Misc.)  
 Dey N. C. with Mapleton 93 (Der.)  
 Dhar J. 81 (Misc.)  
 Dharmendra & Lowe J. 606 (Lep.)  
 Dharmendra, with Lowe, 290 293 (Lep.)  
 Diamantia, A. 599 (Hel.)  
 Dias, E., 801 (Fev.)  
 — & Martins, A. V. 374 (Fev.)  
 Dias de León, A. 461 (Mal.)  
 Dickson, E. C., 459 (Misc.)  
 Dikshit, B. B. with Nasdi, 664 (Mal.)  
 Dumitry T. J. 284 (Lep.)  
 Dnnik, J. A. & Dnnik, N. N. 678 (Hel.)  
 Dnnik, N. A. with Dnnik, J. A. 678 (Hel.)  
 Dnnina, N. A. with Mochikova, Malakhov Paviola & Lavchuts, 803 (Fev.)  
 Dasher C., with Anderson, 809 (Lenth.)  
 Dodda, G. E. 72 (Misc.)  
 Doderio, J. 169 170 642, 643 646, 647 (Rab.)  
 Dogra, J. R., 804 (Mal.)  
 Dominguez Calán, J. M. 885 (Mal.)  
 Donaben, A. & Lestoquard F. 872 bis (Lenth.)  
 Doorenbos, W. 741 (Chl.)  
 Do Patas, D. & Porras, S. 286 (Lep.)  
 Dorner A. 891 (Lep.)  
 Doukhanas M. with Krenzfeld & Polomcor drasev 420 (Mal.)  
 Douthwaite, M. with Gear 787 (Fev.)  
 Dowdowell R. M. 585 (Hel.)  
 Draganesco, S. with Manesco 653 (Rab.)  
 Drabkav J. 23 (Mal.) 781 (Fev.)  
 Drew C. B. with Kirk, 877 (Lenth.)  
 Dreyfus, J. R. 456 (Misc.)  
 Drummond, J. C., with Yodkin & Hawkeley 890 (Diet.)  
 Dubois, A., (293) (Lep.)  
 — Dupont, A. Coenraets, E. & Degotte, J. 290 (Lep.)  
 — Gavrilov W. & Fester A., (293) (Lep.)  
 Dubovnikov P. A. with Lavrov 880 (Lenth.)  
 Dahart, with Bahard & Le Loard 506 (Lept.)  
 Duncan, G. G. with Carey 801 (Fev.)  
 Dungal, N. 803 (Hel.)  
 Dupont, A. with Dubois, Coenraets & Degotte 290 (Lep.)  
 Dupoux, R. Manni, C. & Bartheas, R. 586 (Mal.)  
 — with Villain, 27 (Mal.)  
 Dupuy L. 284 (Lep.)  
 Duran, P. 830 (Misc.)  
 Durand, P. 360 (Fev.)  
 — with Laugret, Belfort & Lefaucheur 794 (Fev.)  
 Duren, A., 21 (Mal.)  
 Durnov, C. 495 (Y.F.)  
 — & Arques E. 381 (Fev.) 906 (Misc.)  
 — & Carrière, C. 499 (R.F.)  
 — with Pelletier Jonchère & Arquis, 494 (Y.F.)  
 — with — & Martin, 115 (Y.F.)  
 Duzan, J. & Bonnet J. (549) (Lep.)  
 — with Vigne, 877 (Lenth.)  
 Duvor M. with Babonneix & Poillet 52 (Sp.)  
 Dyer R. E. with Brigham, 782 (Fev.)  
 Dyke H. W. 285 (Lep.) 748 (Pl.)  
 Dyrenkorth I. Y., with Brown, Griffiths & Erwin, 725 (Mal.)

## E

- Earle W. C. 21 (Mal.)  
 East Africa, 88 (B.R.)  
 East African Medical Journal, (692) (Diet.)  
 Echemondia, J. 591 (Am.)  
 Eddis, B. with Meyer & Anderson-Stewart, 503 (Lept.)  
 — with — Connor & Smyth, 212 (Pl.)  
 Edge P. G., 256 (Mal.)  
 Eekens, J. W. & Van der Horst, G. A., (119) (Hel.)  
 Egypt, 286 (Lep.)  
 Egypt, Ministry of Public Health, 95 (Mal.)  
 Eisenbrandt, L. L. 774 (Hel.)  
 Ejercito, A. & Santos, G. O., 31 (Mal.)  
 Ejmont, L. 270 (Hel.)  
 Elhadava, S. I. with Rachana Miljetina & Kogan 53 (Mal.)  
 Eltinger P. with Beckh & Speer, 685 (Diet.)  
 — Hassan, A. & Taba, M. M. 71 (Misc.) 315 (Diet.)  
 Ellis, M. 78 (Misc.)  
 Emerson, L., with Munday Shepherd, Hamil, Poole, Macy & Radford, 848 (Misc.)  
 Enault, M. 591 (Am.)  
 Enesco, M. & Radescu A., 313 (Diet.)  
 Engelbreth-Holm, J. & Smith, C. C. W., 849 (Misc.)  
 Enkolopov S. K. 572 (Mal.)  
 Epsteina, G. W. & Avakian, A. 590 (Am.)  
 Erchow V. S. & Malygina, S. A., 604 (Hel.)  
 Erhardt, A., 678 (Hel.)  
 Ermen, J. 870 (Lenth.)

Erwin, S., with Brown, Griffiths & Dyrenforth 723 (Mal)  
 Escornel E., 836 (Misc.)  
 Eskey C. R., 754 (Pl.)  
 Eskin, V. A. 814 (Mal.)  
 Eskridge L., with Hegner 456 bis (Misc.)  
 Essex, H. E., with Taube 432 (Vma.)  
 Rubank, H. G. with Hampton, 800 (Fev)  
 Evans A. M. 830 (B.R.)  
 — & Leeson, H. S. (148) (Misc.)  
 Evans B. D. F. with Willis 846 (Misc.)  
 Evans R. B., 878 (Leish.)

## F

Fábrega, J. M., with Matilla & Vach 419 (Mal.)  
 Faergman, P., 842 (Misc.)  
 Fairer C. D. with Kiker & Flanary 803 (Mal.)  
 Fairley K. D., 684 (Diet.)  
 Fairley N. H., 41 (Sp.) 265 (Mal.)  
 — & Mackie F. P. 53 (Sp.)  
 Farid Mahmood, 413 (Oph.)  
 Farinaud, E., 808 (Mal.)  
 — Baccaloni L. Latasto, C. & Nguyen Van-Lien, 518 (Mal.)  
 — & Moreau, P. 187 (Mal.)  
 Farinaud, M., 262, 562 (Mal.)  
 Faure-Beaulieu M. & Brun, G. 887 (Lep)  
 Faust, E. C. 259 811 (Mal.)  
 — with Dauer 20 (Mal.)  
 Federated Malay States, 20 (Mal.) 58 (Misc.) 481 (Rep.)  
 Feldberg, W. & Kellaway C. H. 434 436 bis (Vma.)  
 Feldt, A., 502 (R.F.)  
 Feng, L.-C., 913 (Misc.)  
 — & Chin Y. T. 191 (Mal.)  
 Fernández, J. M. M. 289 (Lep)  
 Fernando, A. C. with Wade & de Simon, 685 (Lep)  
 Ferreira, L. C. with Chagas, da Cunha, Castro & Romasla, 873 (Leish.)  
 Fester A. with Dubois & Gavrilov (293) (Lep)  
 Festschrift Bernhard Nocht zum 80. Geburtstag von seinen Freunden und Schülern, 477 (B.R.)  
 Fialkovsky A. B. & Tveritina, O. A. 135 (R.A.)  
 Fialkovskaja, L. P., with Chapurakaja Bagenova & Leitman, 135 (Am.)  
 Ficker M., 295 (Lep)  
 Field J. W., Niven, J. C. & Hodgkin, E. P., 36 (Mal.)  
 Fiji & Western Pacific, 537 (Rep.)  
 Finmayer M. 212 (Pl.)  
 Findlay G. M., (498) (Y.F.) (929) (Misc.)  
 — & MacCallum, F. O., 110 119 124 (Y.F.)  
 — with MacCallum, 125 (Y.F.)  
 — with Roubaud & Stefanopoulo 124 (Y.F.)  
 Fischer O., 813 (Mal.)  
 Fischer W., 577 (Am.)  
 Fitzpatrick, F., with Zimmer & Wei, 383 784 (Fev)

Flanary P. N. with Kiker & Fairer 805 (Mal.)  
 Fleischmann, G., 514 (Mal.)  
 Floriani, L. & Floriani C., 298 (Lep.)  
 Flu, P. C. 115 (Y.F.)  
 Foley H. & Parrot, L. 411 (Oph.)  
 — & Catanei A., 91 (Der)  
 de Fonbrune P. with Comandon 921 (Misc.)  
 Fong T. C. C. 576 (Mal.)  
 Fontenelle J. P. 758 (Pl.)  
 Fourie L., 751 (Pl.)  
 Fournier J. 456 (Misc.)  
 Fox, H. 91 (Der)  
 Franche M. with Slatineanu Balteanu & Potop 314 (Diet.)  
 Franz, W. 60 (Misc.)  
 Fraser N. D. with Wade 289 (Lep)  
 Freeman, M. with Burnett, 83 835 (Misc.)  
 Frégonneau W. 837 (Misc.)  
 Freire Muñoz, C. 643 (Rab.)  
 French, M. H., 347 712 (Tryp)  
 French, S. G. 176 (Rab.)  
 Friedmann J. 100 (Mal.)  
 Frisbee F. C. with Macneal & Krumwiede 310 (Chl.)  
 Frye W. W., with Meleney 583 585 (An.)  
 Fulton, J. D. & Christophers, S. R., 711 (Tryp)  
 — with — 709 (Tryp)

## G

Gabba, 700 (Tryp)  
 Gacoba C., with Nolasco 272 (Hel.)  
 Galliard H. 142 (Misc.) 387 388 762 (Hel.)  
 — Dang-Van-Ngu & Phan Huy-Quat, 267 (Hel.)  
 Gallat, J. with Bernard & Guillermin, 308 ter (306) 309 (Chl.)  
 — with Lefebvre 740 (Chl.)  
 Galvão, A. A. & Lane J. (571) 801 (Mal.)  
 — & Corrêa, R., 572 (Mal.)  
 Gambia, 153 (Rep.)  
 Gambrell, W. E. 729 (Mal.)  
 Garcia, E. Y. 816 (Mal.)  
 — with Africa & de Leon, 601 bis (Hel.)  
 — with — & Refuero 773 (Hel.)  
 Gardner A. D. & White P. B., 306 (Chl.)  
 Garin, C., 517 (Mal.) 673 (Hel.)  
 Gaschen, H. & Raynal, J. 192 (Mal.)  
 Gasperini, G. C., 185 857 bis (Leish.)  
 Gass, H. H., 891 (Lep.)  
 Gaubert, with Giraud, 868 (Leish.)  
 Gaud, 793 (Fev)  
 Gaud, M. 144 (Misc.)  
 Gauducheau, A. 435 (Misc.)  
 Gaunt, W. E. with Dangerfield & Wormald 714 (Tryp)  
 Gavrilov W., with Dubois & Fester (293) (Lep)  
 Gear J. H. S. & Becker L. H., 787 (Fev)  
 — & Douthwaite M. 787 (Fev)  
 Gebert, S., 193 (Mal.)  
 Genevray J. & Bruneau J. 741 742 bis (Chl.)  
 — Tonmanoff C. & Hoang Tich-Try 808 (Mal.)  
 Gentzkow C. J., 569 (Mal.)

- Gerber M (750) (Pl)  
 Gorman, A., with Montestruc & Chitandre  
 362 (Fev)  
 — & Morvan, A., 782 (Fev)  
 — — & Baben, R., 631 (Diet)  
 Germond, R. C., 285 (290) (Lep)  
 Geronner, E. with Schwetz 804 (Mal)  
 Ghoal, with Lal & Roy 312 (Diet)  
 Ghosh, B N & Das, S. S. 430 (Vms)  
 Ghaoungui, P. 653 (Diet)  
 Gharreb, A. A., with Shaw 665 (Hel)  
 Gibbs, E. M., with Battel Henry Solomon  
 & Trevan, 731 (Mal)  
 Gibraltar 620 (Rep)  
 Gilbert, A. P. W. with Overbeck, 516 (Mal)  
 Gil Collado, J. 190 (Mal)  
 Gil, C. A. 694 (B R)  
 Gill, D. G., with Denson & McAlpine, 174  
 (Rab)  
 Gillan, J., with Rodham, 769 (Hel)  
 Gildea, E. C., 113 214 (Pl)  
 Ginsburg, J. M. 290 (Mal)  
 Giordano, F., 656 (Mal)  
 Giordano, M. 933 (B R)  
 Girard, G. 707 (Pl)  
 Girard, P. Boudouresques, Blanc & Berger  
 668 (Lash)  
 — & Gaubert, 668 (Lash)  
 — with Monges J & Monges, F. 177  
 (Lash)  
 Giron, R. 888 (Am)  
 Gironi, M. 149 (113) (Misc)  
 Girood P., 790 791 *err* 796 (Fev)  
 — & Tannenbaum, S. 366, 792 (Fev)  
 Ghar L., with Cruca, Ballif, Chalaruco &  
 Isaac, 76, 32 (Mal)  
 Glyn Hughes, F., Lorne, E. M. & Yorks W  
 858 (Mal)  
 Gminder E., 220 (Hel)  
 Godart, J. (929) (Misc)  
 Godfrey, M. F. 271 (Hel)  
 Gourea, E. with Blanc & Balthazard 780 (Fev)  
 Gokhale S. K., with Bokhey Maladkar &  
 Balamonia, 448 449 (Misc)  
 Goldberg, L. H. 833 (Misc)  
 Gold Coast, 330 (Tryp)  
 Golden, L. A. 574 (Mal)  
 Golding, F. D. 702 (Tryp)  
 Golovine, S. 557 (Lep)  
 Gonggrip, L. & Soudado R. (31) (Mal)  
 González, A. J. 631 (Rab)  
 Gonzalez, G. Boggino J & Rivarola, J. B.  
 184 (Lash)  
 — & Olivera y Silva, M. 183 (Lash)  
 — & Rivarola, J. B. 435 (Misc)  
 Goodman, H., 78 (Misc)  
 Goodwin, M. H. Jr with Hill, 37 561 (Mal)  
 Gordon, L. S. with Wright & Bonczewich, 381  
 (Hel)  
 Gore R. N., 190 (Mal) 772 (Hel) 916 (Misc)  
 Gorgas Memorial Institute 823 (Misc)  
 Gorter, A. J. 391 (Hel)  
 Gorden, M. 361 (Fev)  
 Goso, B. (37) (Mal)  
 Goso R., 188 (Mal)  
 Gouget, R. 251 (Mal)  
 Gournou, E. Mondon, H. Maryon, H. &  
 Lahillonne, P., 789 (Fev)  
 Grall, A. 301 (Lep)  
 Grant, J. M. Zachlosche, E. & Spies T. D.  
 639 (Diet)  
 Grassert, E., with Pirie 757 (Pl)  
 — & Zootendyk, A., 522 (Vms)  
 Grassi, G., 893 (Mal)  
 Gray P. C., with de Meillon, 14\* (Misc)  
 Gray J. D. A., Peters, B. A. & Davies, L. G.  
 785 (Fev)  
 de Groot R. 762 (Hel)  
 Gruffita, T. H. D. with Brown, Erwin &  
 Dyrenforth, 725 (Mal)  
 Grootings, J. W. 902 (Mal)  
 Grüber W. 855 (Oph)  
 Gumbert J. M. 702, 704 706 (Tryp)  
 Guehard, with Joyeux & Poilane, 34 (Mal)  
 Guehard, P., with Labernadie, 690 (Lep)  
 Gendetti, C. 323 (Tryp)  
 Guitaumont, F. with Tisseul 299 (Lep).  
 653 (Rab)  
 — with Tisseul & Rivarola, 860 (Lep)  
 Guitier J. with Bernard & Gallot, 305 *err*  
 308 309 (Chl)  
 Gundersen, E. & Berner O. 552 (Lep)  
 Gunther C. 102 (Mal)  
 Gunther C. E. M. 829 (Misc)  
 Gupta, P. C. S. with Napper 450 (Misc)  
 Gupta, S. C. S. 517 (Mal)  
 Gurley M. K. with Hoyt, 648 bis (Rab)  
 Gusev I. V. 134 (Mal)  
 Guthrie-Taylor G., (559) (Lep)  
 Gutermann, E. M., with Provovarov 812 (Mal)  
 Gutierrez, E. with Leyva, 78 (Misc)  
 Gutierrez, M. with — & Mladalekha,  
 446 (Misc)

## H.

- Habert, M., 392 (Hel)  
 Habig, J. M. 834 (Misc)  
 Hackert, L. W. 137 (Misc)  
 Haden, R. L., 839 (Misc)  
 Hadjicostacos, J. 663 (Mal)  
 Hagemann, P. with Dahr 47 (Sp)  
 Hailey 634 (B R)  
 Hakanson, E. G. 582 (Am)  
 Halperme, M. O. 670 (Hel)  
 Ham, T. H. 482 (Bl)  
 Hamil, B. M. with Munday Shepherd,  
 Emerson, Poole, Macy & Rufford, 843  
 (Misc)  
 Hamilton, J. F. (445) (Misc)  
 Hampton, B. C. & Enbank, H. G. 800 (Fev)  
 Hansen K. 47 (Sp)  
 Hanson, H. 487 (Y F)  
 Harbhagwan S. A. S. with Kachar 96 (Mal)  
 — with Wata 484 (Bl)  
 Hardy A. V. 879 (Am)  
 Harkness, J. W. P. & Samaha, M. Y. 96  
 (Mal)  
 Harris, L. 318 (Diet)  
 Harrison, G. A. 908 (Misc)  
 Harvey W. F. 80 (Misc)  
 Haze, G. M. with Pinkerton, 372 (Fev)  
 Hasman A. with Ellinger & Taha, 71 (Misc)  
 315 (Diet)  
 Hassett, C. J. 339 (Fev)  
 Haser A. 101 (Mal)  
 Hawes, R. B. 662 (Diet)

Hawking, F., with Young 833 (Misc.)  
 Hawksley J. C., 689 (Diet.)  
 — with Yudkin & Drummond 690 (Diet.)  
 Hayter R. T. M. with Chopra & Sen 30 (Mal.)  
 Headlee, W. H. with Scott, 672 (Hel.)  
 Health News, New York, 801 (Fev)  
 Heck, F. J., with Wolman, 54 (Sp.)  
 Hefley H. M. with Canavan, 578 (Am.)  
 Heggs, T. B., 735 (Chl.)  
 Hegner R. 454 (Misc.)  
 — & Eskridge, L., 456 bis (Misc.)  
 — & Wolfson F., 730 (Mal.)  
 Henderson, G., (547) (Lep)  
 Henderson, H. J., 292 (Lep)  
 Henderson, L. H., 178 (Leish.)  
 Hendrix, H. with Rodhain, 106 (Mal.)  
 Hennessy R. S. F. 750 (Pl.)  
 Hennard, C., with Brutsaert, 704 (Tryp.)  
 — with van Hoof & Peel, 330 bis 334 335 336 693 (Tryp.)  
 Henry T. A., with Buttle, Solomon Trevan & Gibbs, 731 (Mal.)  
 Herr B. S., with Catier & Park, 843 (Misc.)  
 Herrada Libre, M., with Arenas Martorell 167 (Rab)  
 Hertig M., 375 (Fev)  
 Hervé, 877 (Leish.)  
 Hewitt R. I. with Maxwell 104 (Mal.)  
 Hill, R. A., 657 (Mal.)  
 — & Goodwin, M. H., Jr., 37 561 (Mal.)  
 Hill, R. B. 23 (Mal.)  
 Hloman, E. H., 385 (Hel.)  
 — & Kampmeier R. H. 585 (Am.)  
 Hirasaki, with Matsumoto, 815 (Mal.)  
 Hisano, K., 743 (Chl.)  
 Hissette, J., 787 (Hel.)  
 Hoang-Tsch-Try with Genevray & Toumanoff 808 (Mal.)  
 — with Toumanoff 690 (Mal.)  
 Hoare, C. A. 331 (Tryp.) 876 (Leish.)  
 — & Broom, J. C. 701 (Tryp.)  
 Hobday J., 652 (Rab.)  
 Hodgkin, E. P. with Field & Niven, 36 (Mal.)  
 Hoffmann W. H. 119 (483) (Y.F.)  
 Holborn J. M., 145 (Misc.)  
 Holland, E. A., 907 bis (Misc.)  
 Hollande A., 923 (Misc.)  
 Holmes, F., 185 (Leish.)  
 Homa, A. R. 511 (Mal.)  
 van Hoof, L. Hennard, C. & Peel, E. 330 bis 334 335 336 693 (Tryp.)  
 Hoops, A. L., 659 (Mal.)  
 Hope-Gill, C. W. 705 (Tryp.)  
 Hopkins G. H. E. 750 (Pl.)  
 Horwitz, M. T. & Tunick, L. 445 (Misc.)  
 Hosoe I. S., with Menra, 221 (Hel.)  
 Housman, 657 (Mal.)  
 Hovnanian, P., Jebejian, R. & Yenikmahian, H. A., 183 (Leish.)  
 Hoyt, A. & Gurley M. K., 648 bis (Rab.)  
 Hsieh, C. K. with Wang, 602 (Hel.)  
 Hsieh, T. Y., Chang, S. L. & Yang, C. S. 362 (Fev)  
 Hu C. H. & Pal, H. C., 888 (Leish.)  
 Hu, C. H., with Pal, 867 (Leish.)  
 Hu, S. M. K., 369 (Hel.) 660 (Mal.)  
 — Wong, H. & Li, B. C. 387 (Hel.)  
 — & Yu, H., 197 (Mal.)

Huard P. 58 (Misc.) 586 (Am.)  
 Hueck, O. & Wen Huan Hui 601 (Hel.)  
 Hughes A. W. Mich. with Ashmore 145 bis (Misc.)  
 Hughes, W. 547 (Lep.)  
 Huiyenga, L. S. (547) (Lep.)  
 Hukuda, S. & Aki, K. 218 (Hel.)  
 Humperdinck, C., 842 (Misc.)  
 Hunter W. C. with Beeman, 921 (Misc.)  
 Hurst, E. W. 163 (Rab.)

## L

Iamandi with Nicolesco & Strat, 382 (Hel.)  
 Ider, Y. 174 (Rab.)  
 Ienach H. 343 (Tryp.)  
 Imma, A. D. 166 (B.R.)  
 Immon, E. H. with Callender (592) (Am.)  
 Innes, J. R., 882 (Lep.)  
 Ioff I. G. & Tiflov V. E. (921) (Misc.)  
 Ionescu, P. with Cioca, Tomescu, Badenski, G., Badenski, I. & Tenteanu, 428 (Mal.)  
 Iraxabel Langu 591 (Am.)  
 Irish Journal of Medical Science 366 (Fev)  
 Isajev L. M. (135) (R.F.)  
 Isaac, M. with Cioca Baliff Chelarescu & Glaser 28 32 (Mal.)  
 Isoka, H. with Miyahara & Mochita, 419 (Mal.)  
 Ismail, M., with Kamal & Samaan, 752 (Pl.)  
 Israel, R., with Lemierre & Laporte, 865 (Leish.)  
 Isaacs, M. C. G. with Dacie & Wilkinson, 482 (Bl.)  
 Ito T., with Kawamura, Nakamura, Kamimura & Sato 374 (Fev)  
 Ivanic, M., 101 (Mal.) 458 (Misc.) 582 (Am.)  
 Izar G. & Lenn, F. 588 (Am.)  
 — Scuderi, F., 588 (Am.)

## J

Jack, R. W. 140 (Misc.)  
 — & Williams W. L. 338 (Tryp.)  
 Jack, W. A. M., 377 (Fev)  
 Jackson, C. H. N. 140 (Misc.)  
 Jackson R. B., (864) (Mal.)  
 Jacobs W. P. with Chellappah, 542 (B.R.)  
 Jacomo I. 327 (Tryp.)  
 — with Castellani 327 ter 328 (Tryp.)  
 Jacotot, H. 648 652 (Rab.)  
 — & Le Roux, G., 168 652 (Rab.)  
 Jahnel, F. 127 501 (R.F.) 128 (R.B.F.)  
 Jakhyan, Z. A. & Karasova, O. A. 33 (Mal.)  
 James, C., 906 (Misc.)  
 James, C. S., 828 (Misc.)  
 James, S. P., 110 (Y.F.) 255 (Mal.) 486 (Y.F.)  
 Jebejian, R. with Hovnanian & Yenikmahian, 183 (Leish.)  
 Jerace, F. 457 (Misc.)  
 Johannsen P. 44 (Sp.)  
 Johnson, C. G. 146 (Misc.)  
 Johnson C. M. 722 (Tryp.)  
 Johnson, H. A., with Watson & Hiker 512 (Mal.)  
 Jolly A. & Danglemont, F., 505 (Lept.)



- Laron, V., 743 (Chl)  
 — with Raynal, 733 (Chl)  
 Latta, L. & S. 554 (Lep)  
 Ling, L. C., with Yao, 191 (Mal)  
 Link, T. 430 (Vms)  
 Lira, A. E. E. 216 (Hel)  
 Linton, R. W., 309 (Chl)  
 — Seal, S. C. & Mitra, B. 742 (Chl)  
 — Shrivastava, D. L. & Seal, S. C. 744 (Chl)  
 Litwinski, J. J. 74 (Mal)  
 Llovera, A. I. (134) (Mal). 134 (Misc)  
 Lister, S. 440 (Misc)  
 Liu, K. 333 (Hel)  
 Liverato, S. Vaghiaro, M. & Kokaraki, N. 515 (Mal)  
 Livschitz, J. M. with Mochkovski, Doomsa Malakhov & Pavlova, 803 (Fev)  
 Lybets, T. with Banzel, 574 (Vms)  
 Lleras Acosta, F. 551 bis (Lep)  
 Lloyd, H. M., 702 (Tryp)  
 Lobel, L. W. M., with Lampe, 560 (Lep)  
 Lochte, T. 90 (Der)  
 Lodder, J. & Müller, H. 443 (Misc)  
 Loewenthal, L. J. A. 83 (Der). 833 (Misc)  
 Logothetis, E., Katsanaki, E. & Katsanaki, G. 790 (Fev)  
 Lombard, with Vigas & Vidal, 299 (Lep)  
 Lombard, R., with Vigas 633 (Der)  
 Loo, J. H. 302 (Lep)  
 Lomando, N. Chamotis, V. & Chouffin, P. 726 (Mal)  
 — & Sotomaden, D. 35 (Mal)  
 Lorenz, F., 810 (Mal)  
 Lore, H. 733 (Mal)  
 Lorne, with Glyn-Hughes & Yorke 653 (Mal)  
 Lorne, E. M. with King & Yorke 343 (Tryp)  
 — & Yorke W., 342 (Tryp)  
 Lowe, J., 302 550 883 (Lep)  
 — & Chatterji, S. N. 297 (489) (Lep)  
 — & De V. L., 556 (Lep)  
 — & Dharmendra, 290 293 (Lep)  
 — with Dharmendra, 883 (Lep)  
 Lowenstein, W. 323 (Vms)  
 Land, E. E. with Denna, 577 (Am)  
 Lundberg, K. R., 720 (Tryp)  
 Lundsteen, E. 60 (Sp)  
 Lwoff, M. 722 (Tryp)  
 Lytle, W. J., with Coger & Vetter, 638 (Lep)
- M
- Ma, Y. C., with Tung, 713 (Tryp)  
 MacAlpine, J. G. with Denison & Gull 174 (Rab)  
 MacCallan, 856 bis (Oph)  
 MacCallan, A. F. 413 (Oph)  
 MacCallum, F. O. & Findlay G. M. 123 (V F)  
 — with — 110 119 124 (V F)  
 McCoy, G. W. 645 657 (Lep)  
 McCoy, O. R. & Chu, T. C., 221 (Hel)  
 MacCreary, D. & Starnes, L. A. 424 (Mal)  
 Macha, J. W. S. 148 (Misc)  
 McGuire, J. P. with Shortt, Brooks, Stephens & Lahiri, 171 (Rab)  
 Macht, D. L., 432 (Vms)  
 McDonald, A. G., 649 (Rab)  
 MacKenna, R. W., 163 (B R.)  
 Mackie, F. P., with Fairley 53 (Sp)  
 MacMurray, E. B. 554 (Lep)  
 — with Aycock, 884 (Lep)  
 — & de Leon W. 293 (Lep)  
 MacLeod, J. M. H. 545 (Lep)  
 McNaught, J. B. with Pierce, 234 (Hel)  
 Macneil, W. J. Frabee, F. C. & Krummholz, E. 310 (Chl)  
 McNeil, E., with Hobbs & Wood, 353 (Tryp)  
 MacQueen, M. D., 697 (Tryp)  
 Macy, I. C. with Monday, Shepherd, Emerson, Hamill, Poole & Rufford, 843 (Misc)  
 Madras 743 (Chl). 779 (Fev)  
 Magritsky (134) (Mal)  
 Maitra, G. C. with Kapala, 339 (Fev)  
 Majid, S. A. 140 (Misc)  
 Majumdar, D. N. with Napper, Das Gupta, Chaudhuri, Sen, Rao Chaudhuri & Sen Gupta, 846 (Misc)  
 Makar, N., 267 268 (Hel)  
 Malakhov, B. J., with Mochkovski, Doomsa, Pavlova & Livschitz, 803 (Fev)  
 Mahomed, B. 27 108 bis (Mal). 179 180 863 (Lenth)  
 Malandkar, M. A. with Sobhey Gokhale & Billimoria, 448, 449 (Misc)  
 Malana Survey of India, 416 (Mal)  
 Malik, K. S. with Pasocha & Lal, 682 (Der)  
 Malta, 205 (Pl)  
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 Malval, J. & Palod, V., 733 (Chl)  
 Mahyuma, S. A. with Erchow 604 (Hel)  
 Manalang, C., 884 (Lep)  
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 Manuapra, A. with Monaco & Cito, 663 (Mal)  
 Manohar, K. D. & Khosrawy K. K., 813 (Mal)  
 Manson, D., 811 (Mal)  
 Maroon-Bair, P. 61 64 (Misc). 879 (Lenth)  
 Maxwell, R. D. 93, 731 (Mal)  
 — & Hewitt, R. I. 104 (Mal)  
 Mapstone, P. A., 763 (Hel)  
 — & Bhaduri, V. V. 224 772 (Hel)  
 — & Day, V. C. 83 (Der)  
 — & Mukerji, A. K., 282 (Hel)  
 Marbach & Appelmans, 767 (Hel)  
 Marchoux, E. & Chouine, V. 297 892 bis (Lep)  
 — — & Kochlin, D. 301 (Lep)  
 Marchais, I. & Caines, E., 35 (Mal)  
 Maroon, H. with Gouron, Mondon & Lahiloune, 789 (Fev)  
 Marbach, P. with Sparrow 794 (Fev)  
 Marmeco, G. & Draganenco, S. 653 (Rab)  
 Marun, C. with Dupoux & Barthas, 666 (Mal)  
 Marnette, 256 726 (Mal)  
 Marnette, H. 187 (Mal)  
 Maras, F. M., 308 (Chl)  
 Marsh, F. 831 (Misc)  
 Marshall, J. F. & Staley, J. 141 (Misc)  
 Martel, J. E. 729 (Mal)  
 Martilotti, F. 276 (Hel)  
 Martin, J. with Palmer & Doreux, 115 (V.F)  
 Martin, P. 591 bis (Am)  
 — with Morn 36 (Mal)

- Martini, E., 83 (Mal.)  
 Martina, A. V. (665) (Hel.)  
 — with Dias, 374 (Fev)  
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 Marx, W. & Peck, S. M., 433 (Vms.)  
 Maslungan, V. A., with Tubangui, 594 (Hel.)  
 Mathis, M., 117 118 (Y.F.) 913 (Misc.)  
 — with Nicolau & Baffet, 118 (Y.F.)  
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 May, H., 668 (Hel.)  
 Mayer, M., (898) (Mal.)  
 — with Yocht, 163 (B.R.)  
 Mayne, B., 264 (Mal.)  
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 — Basso G. & Basso R., 353 718 (Tryp.)  
 — — & Chambouleyron, E. J., 721 (Tryp.)  
 — — & Cardoso, A., 654 (Mal.)  
 — & Basualdo, C., 654 (Mal.)  
 — & Jorg, M. E., (719) (Tryp.)  
 Medary, G. C. with Armaghan, 922 (Misc.)  
 Mehta, D. R., 358 (Fev.)  
 — with Smith, 358 (Fev.)  
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 — & Gray, F. C., 142 (Misc.)  
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 de Mello, F. & Pereira, O. L., 299 (Lep.)  
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 Meng, C. & Winfield, G. F., 917 (Misc.)  
 Menghetti, A., (907) (Misc.)  
 Menk, W. & Bock, E., 339 (Tryp.)  
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 — with — Pandit & Swaminath, 922 (Misc.)  
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 Mer, G. with Klugler, 99 (Mal.)  
 Mer, G. G., with Yoeli, 915 (Misc.)  
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 Mertens, W. K., 785 (Pl.)  
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 — Connor, C. L., Smyth, F. S. & Eddie, B., 212 (Pl.)  
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 — with Linton & Seal, 742 (Chl.)  
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 — Morita, K. & Inoka, H., 419 (Mal.)  
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 — Germain, A. & Chandra, S., 362 (Fev.)  
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 — & Sweet, W. C., 771 (Hel.)  
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 — with — & Babu, 681 (Diet.)  
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 — & Canals, A., 28 (Mal.)  
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- Mahle, P. 103, 562 (Mal)  
 — Nauck, E., Vogel, H. & Ruge H. 775 (B.R.)  
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 — & Tesch, J. W. 218 (Hel)  
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 Munet, L. with Spangenberg & Ardau 590 (Am)  
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 Murgatroyd, F. 340 (Tryp)  
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 Nandi, B. K. & Dikshit, B. B. 664 (Mal)  
 Naylor L. E. 178 (Lesh) (566) (Mal)  
 — & Bulmonia, H. S. 451 (Misc)  
 — Chandhri R. N. & Chaudhri, N. N. R. 181 (Lesh)  
 — & Das Gupta, C. R. 82 (Misc)  
 — Chandhri R. N. Sen G. N. Rai Choudhri, M. N. Sen Gupta, P. C. & Majumder D. N. 848 (Misc)  
 — & Gupta, P. C. S. 450 (Misc)  
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 Nash, T. A. M. 332 (Tryp)  
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 Sotomades, D. with Lorando 35 (Mal)  
 South African Institute for Medical Research,  
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 Southwell T. with Blacklock, 854 (B.R.)  
 — & Krahmer A. 860 (Lesh)  
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 Spear E. C., 29 (Mal)  
 Spain, E. L., J. with Watson, 188 (Mal)  
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 390 (Am)  
 Sparrow H. & Mareschal, P. 794 (Fev)  
 — & Roussel, H. 387 (Fev)  
 Spies, T. D. 689 (Dact)  
 — & Arme, C. D. 688 (Dact.)  
 — with Beckh & Ellinger 683 (Dact)  
 — Cooper C. & Blankenhorn, M. A. 690  
 (Dact.)  
 — with Grant & Zachenche 689 (Dact.)  
 — Sasaki Y. & Cross, E. 686 (Dact.)  
 Staley J. with Marshall, 141 (Misc)  
 Stallard H. B. 412 (Oph)  
 Stanton, A. T. 110 (Y.F.)  
 Stearns L. A. with MacCreary 474 (Mal)  
 Stern P. H. P. 44 (Sp)  
 Stefanescu S. with Radvan & Alexandrescu,  
 34 (Mal)  
 Stefanopolski, G. J., 114 (Y.F.)  
 — & Nagano, Y. with Wassermann, R.  
 497 (Y.F.)  
 — with Rowland & Colas-Helcomer 11  
 (Y.F.)  
 — with — & Findlay 174 (Y.F.)  
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 Stella, E. 918 (Misc)  
 Stephens, E. D. with Shortt, McGuire,  
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 Stevens, H. L., 820 (Misc.)  
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 Stott, H. 69 (Misc.)  
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 Strat, C., with Nicolesco & Lazzardi, 382  
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- Stratman-Thomas, W. K., Barber M. A. & Carter J. C. 257 (Mal.)  
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 Strong R. P. 787 (Hel.)  
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 Stubbe Tegibjaerg H. P. with Petri Wanscher & Stubbe Tegibjaerg E. 73 (Misc.)  
 Su D. L. with Chl. 799 (Fev.)  
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 Sudibyo R. M. S. 831 (Misc.)  
 Sun, C. J. & Wu C. C. 861 (Leish.)  
 Sun C. J. with Wu 862 (Leish.)  
 Sundararajan, E. R. with Parthasarathy 303 (Chl.)  
 Sunke, E. J. & Sellers, T. F. 225 (Hel.)  
 Sutton R. L., Jr. 830 (Misc.)  
 Suzuki R., with Nakajyo 294 (Lep.)  
 Suzuki, T. 83 (Misc.)  
 — & Sato S. 845 (Misc.)  
 Swaminath, C. S. with Shortt, 890 (Leish.)  
 Swarts W. B. with Abramowitz 837 (Misc.)  
 Sweet, W. C. 95 (Mal.)  
 — with Moorthy 771 (Hel.)  
 — & Pillai, V. M. 768 (Hel.)  
 — & Rao B. A. 428 (Mal.)  
 — with Rao 97 (Mal.)  
 Swellengrebel N. H. de Buck, A. & Kraan H. 425 (Mal.)  
 — de Buck, A. & Kraan, H. 659 (Mal.)  
 — & Kraan, H. (510) (Mal.)  
 Syddiq M. M. 916 (Misc.)  
 Sydenstricker V. P. with Thomas, 812 (Mal.)  
 Symes, C. B. 110 (Y.F.)
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 Taha M. M. with Ellinger & Hassan 71 (Misc.) 315 (Diet.)  
 Takahashi, Y. 89 (Der.)  
 Tallafiero W. H. 717 (Tryp.)  
 — & Mulligan, H. W. 25 (Mal.)  
 Talice, R. V. 351 (Tryp.)  
 — Rial B. Volonteno M. & Osmani, J. J. 352 (Tryp.)  
 Tanaka, I. with Ohtomo & Koga, 753 (Pl.)  
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 Tanguy with Jolly & Lavergne 107 (Mal.)  
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 — with Berry 680 (Lep.)  
 Taubenbaum, S. with Grood 368 792 (Fev.)  
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 Tarantino G. B. 700 (Tryp.)  
 Taramov V., 270 (Tryp.)  
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 Tashkent, Institute of Epidemiology & Tropical Institute 134 (Misc.)  
 Tate P., 131 (Misc.)  
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 — with Muller 218 (Hel.)  
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 Theodor O. 882 (Leish.)  
 van Thiel P. 136 (Misc.)  
 — & Sautet J. 136 (Misc.)  
 Thomas A. D. & Meatr, W. O. 167 (Rab.)  
 Thomas, J. W. & Sydenstricker V. P. (Mal.)  
 Thomson, E. & Thomson M., 143 (Misc.)  
 Thomson J. 895 (Mal.)  
 Thomson, R. C. M. 913 (Misc.)  
 Tibourakaja, N. A. 35 (Mal.)  
 Tichomirova, M. with Sasurichin, 215 (Pl.)  
 Tifov V. E. with Ioff (921) (Misc.)  
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 Timofejeva, M. E., (134) (Mal.)  
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 — & Guilhaumon F. 299 (Lep.) 653 (Rab.)  
 — & Rivocalen P. 890 (Lep.)  
 Trivoller M. with Beaudement 888 (Lep.)  
 Tobias, J. W. & Vihlo F. L. 924 (Misc.)  
 Tomescu P. with Cmca, Badenski, G. Badenski, A. Ionescu & Teriteanu 428 (Mal.)  
 Tomoyama K. 433 (Vms.)  
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 Toumanoff C. 569 661 (Mal.)  
 — with Genevray & Hoang Tich-T 903 (Mal.)  
 — & Hoang Tich-Try 680 (Mal.)  
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 Travasos J. 365 767 798 799 bis 798 bis (Fev.)  
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 Treillard, M. with Roubaud 139 (Misc.)  
 — with — & Colas-Belcour 571 (Mal.)  
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 — & Ma J. C., 713 (Tryp.)  
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 Vauthey P & Vauthey M 813 (Mal)  
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 — & Lombard, R 693 (Duet)  
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 — Cochrane, R. G & Raj M P 847 (Lep)

- Wade H W & Fraser V D 289 (Lep)  
 — de Simon, D S & Fernando, A. C 685 (Lep)  
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 — with — Teglbjaerg E. & Teglbjaerg, H P S 316 (Duet)  
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 — & Antunes, P C A 489 bis 490 (Y.F)  
 — with Antunes, 491 (A F)  
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- Wills L. & Evans, B D F 846 (Misc.)  
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 — & Yao T N 271 (Hel)  
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 Wu C. & Zia, S H 785 (Fev)  
 Wu A. 269 597 (Hel.)  
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 — & Lombard, R 686 (Diet)  
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 — with — Teglbjærg, E & Teglbjærg H P S 216 (Diet)  
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 — & Sparr, E L Jr 188 (Mal)  
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 — & Yao T. N. 271 (Hel.)  
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 Wong, H., with Hu & Li, 387 (Hel.)  
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 — & Wood S. F. 719 (Tryp.)  
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 — with Wood 719 (Tryp.)  
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MEDICAL AND SANITARY REPORTS  
FROM  
BRITISH COLONIES, PROTECTORATES  
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Summarized by P GRANVILLE EDGE,

*Lecturer in the Department of Epidemiology and Vital Statistics  
London School of Hygiene and Tropical Medicine (University of London)*

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# THE INCIDENCE AND DISTRIBUTION OF HUMAN TRYPANOSOMIASIS IN BRITISH TROPICAL AFRICA

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## Introductory

*We be craftsmen together thou and I* feelingly observed the old Tibetan Lama after having enjoyed the companionship and conversation of the English curator of the museum at Lahore. With a sudden flash of inspiration he realized that neither race nor language colour nor custom were barriers to the comradeship which can exist between persons with a love of true knowledge and the pleasures of good craftsmanship. The sentiment thus voiced in Kipling's incomparable tale is shared by workers of thoroughness and enthusiasm throughout the world and not least by scientific cultivators in the field of Tropical Medicine who day by day are accumulating fragments of medical knowledge to be applied for the betterment of mankind in territories where unusual menaces to health and life are to be found.

But though this professional kinship exists between workers remotely separated though these men and women are conscious of the importance of knowing the results of the investigations of their colleagues in other places and though such results are recorded in a thousand scientific journals and official reports many of the printed messages they carry are fated to lie unread. Lack of time or opportunity or the intervention of other factors combine to frustrate desire and intention with the result that too often the arduous and costly processes of reproduction are wasted, and the dissemination of knowledge delayed or lost.

With these thoughts in mind we concluded that it would be both interesting and useful to select from time to time some disease of outstanding importance in the Colonies and from the Colonial Medical Reports prepare a summary of the varied experiences in different territories so far as the selected disease was concerned. By this means it might be possible to present within convenient compass features of epidemiological importance differences in visible manifestations observed between place and place the principal results of an army of medical investigators working under widely diverse conditions of life race custom etc together with other items of interest and importance.

And so for present purposes *human trypanosomiasis* has been selected for consideration at this stage. Two features however do appear to require no discussion in the first place so far as the British Colonial Empire is concerned it is only in British Tropical African territories

† *Kim* by Rudyard Kipling, Chap. I.  
(1204)



that sleeping sickness occurs as an endemic disease and secondly it may be noted that from examination of available data from official sources, the infection though not of the same degree in all areas, is widely distributed in British Tropical Africa. Sleeping sickness shows a curiously localized incidence at times developing in one area yet failing to occur in closely adjacent territory where the tsetse-fly is found, with the result that there appear wide areas which are entirely or almost infection free separating heavily stricken tracts of country. These striking differences suggest that the specific causes contributing to the evolution of the trypanosome in the *Glossinas* also play an important part in limiting the geographical extension of the disease. It is not unreasonable to expect that official reports may provide items of valuable information which will serve to augment the sometimes meagre references to the epidemiology of the disease met with in standard text-books.

The notes which follow represent nothing more than an attempt to provide a summary transcript of the principal items of information concerning trypanosomiasis contained in Colonial Medical Reports for the year 1936 and arranged for convenience under a series of headings as hereafter

#### *Incidence and Geographical Distribution.*

As regards the numerical assessments of incidence and distribution, together with other features characterizing the disease in the territories concerned, the reader will find these matters discussed at some length in the pages which follow it is therefore unnecessary to burden restricted space with a series of elaborate tabular statements. In these circumstances Table I will suffice to indicate the gross distribution of cases and deaths recorded among patients at Government Hospitals and treatment centres and the total deaths registered during 1936 as due to sleeping sickness.

TABLE I  
*HUMAN Trypanosomiasis*

Area	Hospitals			Total Cases recorded	Total Deaths registered
	In-patients	Deaths	Out-patients		
West Africa	3 843	236	7 094	70 890	235
East Africa	401	26	112	2,770	42
Totals	4 44	262	7,110	73 660	277

In further explanation of these facts it should be observed that in West African territories where upwards of a million cases of sickness (all causes) were treated in 1936 with nearly 8 000 deaths among hospital in- and out-patients, roughly 5 per cent of the cases and 5 per cent of the deaths were due to sleeping sickness. On the other hand in East African territories where approximately three million cases of sickness with over 4 000 deaths were recorded only about 0.1

per cent of the cases and 1.8 per cent of the deaths were due to the specific cause under discussion. But these crude assessments and generalizations are nothing more than preliminary interpretations of the epidemiological features of the disease for more exhaustive examination of the facts brings to light many interesting details and striking experiences.

For example in the Gambia the most westerly of the West African Possessions over 40 per cent of the in-patient cases and 30 per cent of the hospital deaths were ascribed to sleeping sickness during 1936 if in patients and out patients be grouped then these percentages become 5.4 and 15.1 respectively. These assessments are of especial significance when it is remembered that in 1923 only three cases of the disease were recorded for at that time trypanosomiasis was stated to be seen only occasionally. Since then however the disease has steadily increased travellers report a marked increase in tsetse-flies in some areas a hyper-endemic area extends from MacCarthy Island to Kaur on the River on the north bank it extends up to the French border (Senegal) and on the south runs into Western Jarra Tom and the Kombo Districts on the coast. Because of the prevalence of sleeping sickness in the area a hospital was erected at Bwiam some 70 miles from Bathurst and later a subsidiary dispensary was established at Kaiaf 40-50 miles further inland. At these centres between April-December 1936 upwards of 900 sufferers from sleeping sickness were treated. The figures quoted are sufficiently suggestive of the menace of the disease to health and life in the Gambia and yet they may tell but a part of the story for the up-river population is so unfixed that it is difficult to say how many unrecorded cases of the disease exist. What is particularly significant is the observation that a large number of patients who appear to have no symptoms referable to sleeping sickness are found to have enlarged cervical lymphatic glands and give positive gland punctures these chronic low-grade cases constitute a serious danger.

Passing next to Sierra Leone it may be said that here the disease appears to be of no great importance for only sporadic cases have been reported in recent years. In 1936 only three cases none of them fatal were recorded and in common with usual experience all occurred in different parts of the Protectorate. Out of 1,871 African bloods examined during the year only one was found to contain trypanosomes. Roughly east of Sierra Leone and bounded on the West by the French Colony of the Ivory Coast lies the Gold Coast where sleeping sickness continues to be a cause of serious anxiety for during the past five years cases of the disease have increased from 683 to 4,828 and deaths from 45 to 182. During 1936 ten cases occurred among Europeans. The disease is said to be of a chronic indolent nature and it is thought that up to the present there is no evidence of increase in the virulence of the infecting strain. Although full data are not available for 1936 returns indicate that increases in the incidence of the disease tend to occur along roads used by boys from the Northern Territories seeking work in the mines further south thus emphasizing the far-reaching effects upon the distribution of population and public health produced by the development of means of communication and the rapid expansion of the mining industry. Of 4,313 cases of sleeping sickness treated at the nine most important treatment centres in the

territory 3,783 were dealt with at seven centres in the Northern Territories and of the latter 2,746 received treatment at five centres in the north-east corner of the Northern Territories close to the French border (French Sudan and Togoland). At Lawra Hospital, on the western boundary of the Northern Territories where this adjoins the French Ivory Coast there was an actual decrease in the attendances for the treatment of trypanosomiasis, yet special localized surveys in that part of the country indicated that between 35-40 per cent. of the inhabitants examined were infected. With regard to the spread of the disease southwards, it was found that at two towns just within the boundaries of the Colony proper (as distinct from Ashanti and the Northern Territories) out of 108 cases of sleeping sickness seen 78 per cent. were immigrants from the Northern Territories while at the Kumasi disinfecting station where 38,108 immigrants were dealt with two per cent. of them were found to be suffering from trypanosomiasis. These facts are significant.

The last and by far the largest of the West African Colonies to be discussed is *Nigeria* the area of the whole Colony and Protectorate approximating the combined areas of the United Kingdom, France and Belgium, and having a total population of about 20 millions.

Here, over 60 000 cases of sleeping sickness were treated during the year under review and 69 hospital deaths were ascribed to the disease all were African—or at least non-European—cases. Hospital in- and out-patients treated totalled 4,216 while those treated at Dispensaries, etc., numbered 59,889. These figures suggest that in Nigeria, sleeping sickness is a public health problem of magnitude. In the Northern Provinces, the spread of the disease has reached such alarming proportions as to constitute a serious menace to the country. During 1938 the special Sleeping Sickness Teams (five were at work continuously and a sixth team commenced work towards the end of the year) examined 417 495 people, and of these 47,550 or 11.4 per cent., were found to be infected. According to published results infection rates in different areas visited ranged between 2 and 53 per cent. of those examined, but even these local rates sometimes mask important features characterizing local incidence. Teams may be working in an area where the type of country and prevalence of tsetse may seem identical with adjacent heavily infected areas yet the incidence of the disease may prove to be small or among the majority of people in a group of villages incidence may be small with high infection rates in neighbouring groups. For example in the Dan Ja District of the Katsina Emirate the infection rate among 53,000 people examined was 6.8 per cent. among 40 000 of them distribution of the disease was sporadic many of the towns and villages being practically free of infection, yet infection rates exceeding 10 per cent. were met with in occasional hamlets while some 2,000 cases were found in a heavily infected part of the district which the team suddenly encountered.

Turning next to the other side of Africa to territories which might roughly be included in an East African group it may be observed that upwards of 2,770 cases and 452 deaths were ascribed to sleeping sickness with *Uganda* accounting for the majority of the cases and deaths.

In the *Sudan* 150 non fatal non-European cases were reported during 1938 and as in previous years the majority of these (actually

142) were from Temburaf in the Zande District of the Southern Sudan. This area is close to the western boundary of the French Sudan the local topography is said to be ideal for tsetse breeding while inter-communication with infected areas across the frontier and with neighbouring districts is easy. It is further pointed out that a sudden increase in the honey trade caused Zande people to spend weeks at a time in the forests often across the frontier with the result that fresh infections were acquired. Another factor complicating the problem arises from the fact that the inhabitants in this part of the territory have been subject to stringent regulations for 16 years they are said to be inclined to migrate to other areas where regulations are less strictly enforced but often return after a while bringing fresh infections with them.

At Kajo-kajo a town in the Yei District close to the boundary of the West Nile District of Uganda † eight cases occurred among members of the Kakwa and Kuku tribes. A section of the Kakwa tribe who lived close to the frontier were moved in 1935 because of frequent infection and inter-communication with infected areas in Uganda a few cases have occurred since in this sector and the local fly along one river have become infected. With regard to areas in the Southern Sudan where both *Glossina morsitans* and *G. palpalis* are to be found the northern limit of tsetse-fly infestation appears to approximate with Lat. 10°N and to reach eastwards to the boundary of Darfur Province.

In Uganda where upwards of 2 000 cases and 58 deaths were recorded during the year under review the main problem in connexion with the disease is said to have shifted from Lake Victoria to the River Koch in the West Nile District (i.e. from the extreme south to the north west of the Protectorate). From the Lake Edward—George—Albert area (western boundaries of Uganda) it is believed sleeping sickness will shortly be eradicated only 46 (non fatal) cases being recorded in his territory. It is of special interest to note that despite the continued influx of a large number of immigrants from neighbouring territories where sleeping sickness is present—those parts of the shores of Lake Victoria which are infected with *G. palpalis* and therefore potential areas where at any time an outbreak of the disease may occur—no case has been detected since 1933. The Uganda shores of the Lake are now reported to be free from trypanosomiasis except around Mjanji, where the boundaries of Uganda and Kenya adjoin ‡ It is added that it is impossible to say whether the infection is kept alive here by immigrants from Kenya or acquired by Uganda residents visiting Kenya the boundary is an artificial one cutting through a tribal area and it is practically impossible to prevent people from visiting relatives on either side of the border. On the other hand a large increase in the incidence of the disease is reported in the West Nile District (1 876 cases 54 deaths) though it is possible some part of the increase may be due to the introduction of a stricter system of registration leading to the discovery of cases which had previously escaped detection. The rate of infection of fly with trypanosomes

† In 1925 it was reported that some 1,800 cases were under treatment at Temburaf. *Minutes of the International Conference on Sleeping Sickness* League of Nations Publication. C.H. 334 1925

‡ See p 11 *infra*

§ Boundary of Kavirondo See Kenya p 12\* *infra*.

in the River Kosch area (West Nile District) is so high that it contradicts previously accepted views—the high rate suggests infection with two varieties of trypanosomes since in the words of the Report the infectivity rate of the fly has not fallen proportionately to the human rate in the area.

Lying due east of Uganda is Kenya. Sporadic cases of sleeping sickness are met with in South and Central Kavirondo areas bordering Lake Victoria to the west of the territory but the disease does not appear to bulk largely in Kenya's morbidity or mortality experience for only 11 cases and two deaths were recorded in 1936 †.

South of Kenya lies *Tanganyika Territory* having an area more than four times that of the United Kingdom and a population exceeding five millions. Here 538 cases were notified and 384 deaths were ascribed to sleeping sickness during the year—in the Western Province there were recorded 284 cases and 223 deaths, in the Lake Province 139 cases and 87 deaths and in the Southern Province 103 cases with 61 deaths. In the Central Province only 8 cases and one death were reported from Mkalama (near the southern boundary of Lake Province) in Singida District—in this district *G. morsitans* is said to be advancing rapidly both from east and west while *G. swynnertonii* ‡ is advancing from the north. As regards incidence in the territory as a whole it is said that sleeping sickness continues to decline steadily—cases notified in 1936 were little more than half of those notified in the preceding year despite a new outbreak south of the Rufiji River in the Southern Province.

*Northern Rhodesia* bounded on the north by Tanganyika Territory and the Belgian Congo by Nyasaland and Portuguese East Africa on the east and by Portuguese West Africa on the west next calls for consideration. Here 30 cases and five deaths were recorded in 1936 as due to sleeping sickness. The disease is endemic in the territory and appears to occur persistently in isolated cases in certain districts though two areas in particular appear to account for the majority of the cases. To the east of the Colony in the salient formed by the River Kafue in its course south and eastwards on its way to join the Zambesi River is Mumbwa, the administrative centre of this part of the country—in this area, in which *G. morsitans* is fairly widespread 9 non-fatal cases were reported §. Cases also continue to be reported from the shore of Lake Tanganyika—near Abercorn in the extreme north of the Colony—these being *T. gambiense* infections conveyed by *G. palpalis*.

And lastly among the territories included within the East African Group comes Nyasaland—a narrow but fairly extensive strip of country (rather smaller than England and Wales) lying between the western shores of Lake Nyasa and the eastern boundary of Northern Rhodesia. The map contained in the Annual Report shows a somewhat wide distribution of tsetse-fly areas but only 14 (non-fatal) cases appear to have been treated during the year two of them being reported from the endemic area of the Koto Koto District which borders Lake Nyasa.

† In this connection the Kenya Report comments upon the absence of any system whereby changes in the incidence of invalidity might be accurately estimated for the Colony as a whole, etc.

‡ See Footnote p. 126 n/r/s

§ In this area an extensive enquiry was undertaken in 1935 by Dr H. GILKS. See *A. Investigation of an Outbreak of Sleep & Sickness in Northern Rhodesia* H. GILKS, Trans. Roy. Soc. Trop. Med. XXX. No. 2, 1936, pp. 213-222.

In the Northern Province, it is reported that the situation continues to improve and that the recession of the fly towards the north has been maintained.

So far as South African Colonial Possessions are concerned and by this is meant Basutoland Bechuanaland Protectorate and Swaziland neither cases nor deaths due to sleeping sickness were mentioned in Annual Medical Reports for 1936. Here it is convenient to mention that during 1935 Dr W. A. LAMBORN Medical Entomologist Nyasaland Protectorate investigated rumours of the occurrence in the fly area of the Okovango swamps in Ngamiland (Bechuanaland) and other fly areas of a disease known to the natives as Kgotsella the symptoms of which were suggestive of sleeping sickness. Large numbers of natives were examined without finding any indications of the disease and all blood films taken gave negative findings. (†)

### *Preventive Measures*

The nature of preventive organization and its degree of completeness in any particular territory will be determined by such factors as the incidence of the disease fly infestation virulence of trypanosome infection staff available and a variety of other considerations. In these circumstances it follows that measures designed to combat the spread of sleeping sickness in British Tropical Africa will show considerable variation between place and place, sometimes even within the boundaries of the same territory. In some cases large areas may be completely free from the disease with here and there sharply defined localized reservoirs of infection—in other places preventive schemes may have to envisage the greater part of a territory.

In the *Gambia Report* for 1936 it is stated that 'little has been done in preventive measures for this disease' and that experimental tsetse-fly traps were tried at Bwiam (†) with but little success. These meagre references are however scarcely just to medical officers in the territory who for some years have carried out bush and forest clearance work and have been concerned to keep river crossings cleared. This work has its peculiar difficulties along the bed of such a river as the Gambia, which flows through flat country for deprived of waterside growth the banks show a tendency to collapse. An example of what can be done to remove conditions favourable to tsetse fly breeding and at the same time provide for the raising of useful crops was demonstrated at Bullock where the Agricultural Superintendent succeeded in converting a typical tsetse-fly valley into fertile and easily controllable rice-fields. It is disappointing to have to record that this admirable endeavour was not exploited by the local inhabitants. No mention is made in the *Sierra Leone Report* for the same year of special measures to combat the disease, though here again in recent years a good deal of general clearing has been carried out the natives have been encouraged to build their villages on more open sites in outstations and every effort has been made towards limiting the breeding places of *Glossinae*. These labours have proved markedly successful in reducing the numbers of tsetse-flies and reducing infection rates to negligible proportions.

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† *Annual Medical and Sanitary Report for 1935 Bechuanaland Protectorate* pp 36-44

See p 5 *supra* and pp 10\*-13\* for fly-trapping in other territories.

In the *Gold Coast* it is said that preventive efforts vary between area and area—one or other of the generally accepted methods may predominate in various localities all of which contribute to the final solution of the problem. Preventive measures in this territory include clearings for the elimination of fly (though these may be found to have a distinctly limited value except in and surrounding frankly urban areas) clearings to diminish contact between man and fly removal of the population to new fly free areas treatment of all infected persons etc † It is pointed out that clearings in savannah country except those limited to the purposes of protection—such areas being utilized for the raising of low crops—are not unattended by the dangers of erosion and loss of soil the drying up of water holes courses etc and consequent diminution of food supplies. Attention is directed to the fact that already many districts denuded of forest and given over to secondary bush or approaching savannah conditions have their fly problem when water facilities are appropriate. Such conditions are well seen over considerable areas in the valleys watered by the rivers Ankobra, Pra, and Birim and even in the valley of the Denom a few miles outside Accra.

In *Nigeria* preventive measures are organized on a comprehensive scale and include the clearing of tsetse-infested areas at river crossings fords village watering pools the concentration of populations from scattered farm hamlets in infected areas into larger village units in protected areas control of mine labour systematic surveys examination of inhabitants treatment of infected persons etc. For the more effective control of sleeping sickness in *Nigeria* 1936 saw the introduction of two important measures. The first *An Ordinance to make provision for Preventing the Spread of Sleeping Sickness and for the Compulsory Treatment of those Persons infected with Sleeping Sickness* became effective in January 1937 and will be at first applicable to the Northern Provinces only. The second measure, which is expected to exert considerable influence upon the incidence of the disease aims at transferring communities from highly infected areas which could not be rendered and maintained free from tsetse-fly economically to fly free areas where they will be assisted to build model villages on strictly hygienic lines and cultivate food and cotton farms. Up to the present despite all efforts the disease was spreading in the Northern Provinces owing to the fact that funds and staff for expansion of the protective campaign were not available. Prospects for the control of the disease are now very much brighter with the expansion programme coming into operation in 1937.

It has been noted that in the *Sudan* sleeping sickness occurs only in the southern part of the territory ‡. Here provision is made for extensive clearings of the banks of water-courses paths roads etc. in infected areas, the collection of people into villages away from the banks of infected streams the collection of cases of the disease in camps or settlements in fly free areas where they are treated the regular inspection of persons who have entered infected zones and the control of population movements across the southern frontier. It is stated that no locally infected case has been reported where the clearing

† A special survey team is now at work in the *Gold Coast* investigating the incidence and distribution of the disease and advising measures for control.

‡ p. 7\* *supra*

of streams was thoroughly carried out that the concentration and treatment of cases in fly free settlements has been fully justified and that it has even been found possible to keep cattle in those settlements which are sited in the most badly infected fly region in the Sudan. With regard to the control of population movements across the frontiers it is added that a pass system has been introduced for natives wishing to visit or return from Uganda. At three dispensaries on the boundary where passes are countersigned travellers are examined for signs of sleeping sickness. The system commenced to function in September 1936 and from then to the end of the year 439 persons left for and 588 returned from Uganda.

Reclamation of the Lake shore from tsetse infestation in order to reduce the risks of infection is the policy in Uganda and one which is proving highly successful. In order that effective control may be exercised the scheme demands the fulfilment of the following requirements —

- (a) A settlement shall consist of not less than 10 families
- (b) At first all families shall congregate at one point on the lake shore and clearing shall be undertaken in both directions along the shore from that point so that the forest shall recede in proportion as the settlement advances
- (c) Arrangements and supervision shall be the special concern of the Gambolola Chief.
- (d) Sufficient clearing to afford complete protection from fly shall be completed within two months of the date on which each settlement is occupied.
- (e) Clearings on the foreshore shall not be less than 300 yards in length by 100 yards in depth.
- (f) No house shall be erected less than 100 yards distant from high water level.
- (g) No house shall be erected closer than 100 yards to the forest on the flanks—both edges of the clearings at right angles to the shore. These limits may be revised subject to the approval of the Medical Authorities

(h) No tall crops shall be planted between houses and foreshore, and none such within 100 yards of fly-infested bush

(k) Prospective settlers must first undergo a gland examination.

Part of the Lake shore has already been occupied under these conditions and tsetse infestation has been considerably reduced. Gradually it is hoped by controlled re-occupation to render the whole of the Lake shore unsuitable for habitation by tsetse-fly. On the other hand attempts to allow re-occupation except under strictly controlled conditions might produce evil results. In the West Nile area this has actually happened; for the movement of people with trypanosomiasis has resulted in the infection of a new river system which was believed to have been clean originally. The comparative value of the elimination of tsetse-fly by hand-catching or by de-bushing strips along river banks etc. is under examination. So far the balance of evidence appears to be in favour of de-bushing but results are somewhat confused owing to seasonal changes for climatic conditions greatly affect

† See p 7\* *supra*.

‡ Labour employed to make clearings protected by injections of Bayer 205

§ See p 7 *supra*.



In the *Gold Coast* it is said that preventive efforts vary between area and area—one or other of the generally accepted methods may predominate in various localities all of which contribute to the final solution of the problem. Preventive measures in this territory include clearings for the elimination of fly (though these may be found to have a distinctly limited value, except in and surrounding frankly urban areas) clearings to diminish contact between man and fly, removal of the population to new fly-free areas, treatment of all infected persons, etc.† It is pointed out that clearings in savannah country—except those limited to the purposes of protection—such areas being utilized for the raising of low crops—are not unattended by the dangers of erosion and loss of soil, the drying up of water holes, courses etc. and consequent diminution of food supplies. Attention is directed to the fact that already many districts denuded of forest and given over to secondary bush, or approaching savannah conditions, have their fly problem when water facilities are appropriate. Such conditions are well seen over considerable areas in the valleys watered by the rivers Ankobra, Pra, and Birim, and even in the valley of the Denso a few miles outside Accra.

In *Nigeria* preventive measures are organized on a comprehensive scale and include the clearing of tsetse-infested areas at river crossings, fords, village watering pools, the concentration of populations from scattered farm hamlets in infected areas into larger village units in protected areas, control of mine labour, systematic surveys, examination of inhabitants, treatment of infected persons, etc. For the more effective control of sleeping sickness in *Nigeria*, 1936 saw the introduction of two important measures. The first "*An Ordinance to make provision for Preventing the Spread of Sleeping Sickness and for the Compulsory Treatment of those Persons infected with Sleeping Sickness*" became effective in January 1937 and will be at first applicable to the Northern Provinces only. The second measure, which is expected to exert considerable influence upon the incidence of the disease, aims at transferring communities from highly infected areas which could not be rendered and maintained free from tsetse-fly economically to fly-free areas where they will be assisted to build model villages on strictly hygienic lines and cultivate food and cotton farms. Up to the present despite all efforts the disease was spreading in the Northern Provinces owing to the fact that funds and staff for expansion of the protective campaign were not available. Prospects for the control of the disease are now very much brighter with the expansion programme coming into operation in 1937.

It has been noted that in the *Sudan* sleeping sickness occurs only in the southern part of the territory.† Here provision is made for extensive clearings of the banks of water-courses, paths, roads etc. In infected areas the collection of people into villages away from the banks of infected streams, the collection of cases of the disease in camps or settlements in fly-free areas where they are treated, the regular inspection of persons who have entered infected zones and the control of population movements across the southern frontiers. It is stated that no locally infected case has been reported where the clearing

† A special survey team is now at work in the *Gold Coast* investigating the incidence and distribution of the disease and advising measures for control.  
‡ p. 7\* *supra*

carried out in both territories. In Nyasaland where the Medical Entomologist undertakes systematic tsetse-fly surveys the situation continues to improve as the result of extensive bush firing in favourable seasons for the elimination of fly followed by clearance and settlement of natives in fly free areas.

In *Bechuanaland* where a special investigation was carried out in 1935 † the protective steps undertaken included the removal of the populations from tsetse to fly free areas the declaration of the whole fly-belt as a prohibited zone control of movements of population in fly areas together with the adoption of extensive clearance and cultivation schemes in newly settled areas.

### *Treatment*

The remedial measures briefly discussed in the preceding section of this essay deal with sleeping sickness prophylaxis by what may be described as mechanical, agricultural and administrative methods. It remains to consider what references are made in Colonial Medical reports to treatment which aims at the destruction of the trypanosome in the human organism and reduction of existing reservoirs of the virus.

Adhering to order of succession which has so far characterized the discussion of sleeping sickness conditions in the various territories under review and turning first to the *Gambia* for consideration of the treatment aspect of the problem it may be observed that though the 1936 Report speaks of the dispensaries established and of the large numbers of patients treated for sleeping sickness ‡ methods adopted for the discovery of cases and the nature of trypanocidal treatment provided are not described §. Neither is mention made of these matters in the *Sierra Leone* Report it has been stated that only sporadic cases of the disease occur in this territory ||.

In the *Gold Coast* where remedial operations are said to have been undertaken on a considerable scale with mass treatment of sufferers the drugs used and their therapeutic value on trypanosome infections in man receive no notice. It is stated however that through the influence of various Native Administrations in the Northern Territories regularity in the treatment of local sufferers has been secured and that the proportion of relapse cases is gratifyingly low.

The *Nigeria* Report on the other hand contains a comprehensive account of methods of treatment followed at the 20 specially built dispensaries and 6 Native Administration dispensaries (8 more are under construction) in which it is stated the standard treatment has been 3 one-gramme doses of antrypol or Bayer 205 followed by 5 two-gramme doses of tryparsamide. At the time of diagnosis all patients have been given a trial dose of 0.3 gramme of antrypol or Bayer 205 in an attempt to detect the occasional case of idiosyncrasy. This trial dose has been additional to the main course of treatment ¶. The Report goes on to say that before the trial dose method was

† See p 9\* *supra*.

‡ See p 3\* *supra*.

§ See p 12\* *supra* and "Observations on the Therapeutic Action of Three Arsenicals in Gambian Sleeping Sickness" By F MURRAY Ann Trop Med & Parasit. December 1936.

|| See p 5\* *supra*.

¶ *Nigeria, Annual Medical Report 1936.* p 98.

the density of fly. It is added there seems no evidence that either method will eliminate fly rapidly—one or other method may be more suitable according to local conditions.

4 *Pass System* for the control of population movements across the Kenya-Uganda-Tanganyika boundaries is maintained though it is realized that it is practically impossible to guard against chance visits of persons infected with trypanosomiasis†. All people are examined before they are allowed to travel. The pass is obtained from the Chief and is countersigned by a "gland boy" after examination of the holder to ensure the latter is not suffering from sleeping sickness. If a positive finding is recorded the chief is informed, and the person concerned is either sent to the nearest treatment post, or detained to be treated by the itinerant orderly who visits centres once a week. Eight gland post examination centres are at present established.

The *Kenya Report* refers to the continuation of the experiment in clearing riverine and lacustrine areas by means of trapping in South and Central Kavirondo (to the west of the territory adjoining Lake Victoria). These efforts are proving successful, settlements are being established in areas freed from fly and large acreages are being used for cotton production. It was noted that as gravid females are attracted to newly turned soil in light shade, large numbers of pupae could be collected by preparing simple breeding grounds in easily accessible places.

In the Central Province of *Tanganyika Territory* the tsetse-fly problem is somewhat serious in the Singida district‡ where, however, extensive measures against the encroachment of the fly were undertaken by volunteer tribal labour. In two of the cleared areas where land is fertile and water supplies adequate, tribesmen from other areas are settling though it is said to be by no means easy always to secure occupation of cleared areas which when not occupied soon revert to bush again. In the other Provinces the scheme of systematic clearing and re-settlement of inhabitants in fly-free areas is actively followed out. This concentration policy serves to reduce the incidence of sleeping sickness and improve the general condition of the people moved to new areas.§

The Reports of *Rhodesia* and *Nyasaland* for the year under review make no mention of control measures though preventive work is

† See also pp 7-11 *supra*.

‡ See p 8 *supra*.

§ Brief reference must be made to the tragic death of Mr C F M SWYMERSTON C.M.G. Director of Tsetse Research in Tanganyika Territory and of his companion and able lieutenant, Mr B D BERRY the Botanist, as the result of an aeroplane crash near Dodoma, Tanganyika Territory on the 8th of June, 1938. Swynnerton's studies of the habits of tsetse flies led in 1921 to the publication of a paper in which he discussed new methods of reducing the incidence of fly through the control of certain types of vegetation essential to the existence of these dangerous pests. Shortly following the publication of these views, he received an appointment under the Government of Tanganyika Territory for duties which included the further study of the tsetse problem. Under his inspiration and organizing ability tsetse control work developed with such marked success that in 1928 Swynnerton was appointed the first Director of the newly created Tsetse Research Department in the Territory. Despite the most formidable difficulties he and his able staff succeeded in freeing many thousands of square miles of country of the tsetse scourge. For a written record of tsetse control work in Tanganyika Territory the reader is referred to Swynnerton's classic work *The Tsetse Flies of East Africa*.

recommendations of the *Committee on Human Trypanosomiasis* during the year but it was expected that a commencement would be made in 1937

In *Nigeria* a considerable research programme is being actively implemented and ample details of all branches of the work are supplied. The Government Entomologist comments upon some of the results of a three year investigation† of the ecology of *G morsitans* and *G tachinoides* and among other matters calls attention to the fact that the adult longevity of both species decreases as the maximum temperature rises and increases as it falls that these insects shift their breeding grounds to moister and more sheltered sites as evaporation rises throughout the dry season and that the duration of the pupal period increases with falling temperature from 18 days in the hot season to 41 days in the cold. Research work on the trypanocidal properties of various new chemical compounds was continued and results are commented upon at some length. The British compound *Neocryl*§ given in 3-gramme doses at 5-day intervals gave distinctly promising results. This was found to produce rapid clinical improvement and appears to be quite as effective as tryparsamide in practically all the 60 cases treated both the blood and gland juice were cleared by the time of the second routine examination which always followed the third injection of the drug. Four cases only completed a full course of treatment with *Fouadin* alone. Three showed some improvement clinically and trypanosomes could not be found at the end of treatment but they did not disappear from the blood until about the 8th nor from the gland juice until the 3rd-8th injection. Nine cases were given *Bayer 205* in 0.5 gm. 0.75 gm. and 1.0 gm. doses along with the first three injections of *Fouadin* this treatment proved more effective than *Fouadin* alone and at the end of the course all patients could be discharged as cured. Other research work of first rate importance included the continuation of experiments upon the effects of exposing pre-immunized animals to fresh infections|| investigation of the resistance of trypanosomal strains to tryparsamide and of the relationship between *T gambiense* and *T rhodesiense* infections.

As regards the remaining territories in British Tropical Africa references in the *Sudan Uganda Kenya and Nyasaland*¶ Reports are mainly confined to mention of entomological surveys and distribution of the tsetse fly within the boundaries of those territories. The *Tanganyika* Report on the other hand contains a comprehensive account of the continuation of trypanosomiasis research work which has been carried on for several years by Dr J. F. Corson at the Tinde Laboratory. One experiment is concerned with the transmission of *T gambiense* through monkeys by *G morsitans* to ascertain whether

† Gold Coast, *Annual Medical Report* 1935 p. 78, et seq.

‡ Results published in detail under the title of "*Climate the Vital Factor in the Ecology of Glossina*."

§ A complex aromatic arsenical compound S 107 prepared under the auspices of the *Chemotherapy Committee* of the *Medical Research Council*.

|| See *Annual Medical Reports Nigeria*, 1934 1935 1936.

¶ In 1934 LAMBORN and THOMSON began their joint investigation concerned with the mechanical transmission of pathogenic protozoa by non biting haematophagous muscids. Preliminary results were published under the title *Mechanical transmission of Trypanosomiasis etc through the agency of non biting Haematophagous Flies Brit Med Jour* Sept. 1934.

instituted 7 cases of collapse with one death occurred among 6 491 cases treated. In another area 2 cases were recorded among 7,942 patients following the trial injection of 0.3 gramme of Bayer 205 while in two other cases the collapse was so severe that "the patient might well have died if he had received the full one-gramme dose instead of the trial dose." It is said that there is no indication that these mishaps are any more common with antrypol than with Bayer 205 that since the institution of the system of trial doses the number of collapses has been very small, and there have been no fatalities and that the cases of collapse referred to appear to have been cases of rare though true idiosyncrasy and as such liable to react with explosive violence to a small dose of the drug. It is further observed that in no case has intravenous injection of trypanamide caused similar symptoms.

This Report on sleeping sickness work in Nigeria contains so much detailed information of first rate importance that it should be read in its entirety for it is quite impossible to deal adequately with its contents on the present occasion. It must suffice to add that the organized scheme of work has proved conspicuously successful, with the majority of patients attending regularly to receive the full course of treatment. It is of interest to note that while in pagan areas the dispensaries were extremely popular in Hausa areas they are by no means regarded so favourably. The Hausawa regard sleeping sickness as a highly infectious disease and patients having acquired the infection feel ashamed and are shunned by their fellows. The fear of the disease is so great that even when sufferers can be persuaded to seek treatment their neighbours will refuse to associate with them and may even drive them out of their towns.

So far as the seven remaining Possessions in British Tropical Africa are concerned the relevant Medical Reports for 1938 contain little information relating to methods of prophylaxis against sleeping sickness. For these territories as a whole it may be said that medical tours of inspection, systematic examination of natives and concentration and intensive treatment of infected persons are among the measures adopted in varying degrees of completeness in the different areas.

### *Research*

Under this heading it may fairly be said that while no epoch-making discoveries were recorded during 1938 by workers in the various Possessions under review nevertheless Medical Reports do supply convincing evidence of valuable progress made in connexion with various programmes of research even if here and there fortuitous circumstances have sometimes combined to delay the initiation or to interrupt the course of investigations. The notes which follow very briefly refer to some of the work in progress in the various territories under discussion.

In the *Gambia* the investigations of Dr MURGATROYD of the Liverpool School of Tropical Medicine† were concerned with chemotherapy in connexion with trypanosomiasis. Details of the results of this work were not available in time for inclusion in the Medical Report for 1938. As regards the *Gold Coast* it was unfortunate that owing to the difficulty of obtaining an Entomologist it was not possible to carry out the

† See footnote, p. 13 *supra*

and out patients. In some areas infection and case-mortality rates appear unusually high by comparison with experience elsewhere yet if the available facts are incomplete discussion becomes fruitless for conclusions may prove dangerously misleading. Increases in the numbers of recorded cases may be actual and due to epidemic outbreaks or to an increased faith in the efficacy of modern treatment which persuades sufferers to disclose their condition in the hope of securing relief or cure. Increased deaths may be due to unimproved registration to unusual virulence of the infecting organism or to the arrival of ill-conditioned immigrants from the heavily infected areas to areas in which registration is effective on the other hand unknown numbers of sickness and death may and do occur in areas where notification and registration are non-existent. While some of these and other factors in the problem may sometimes be touched upon in some Reports no common rule of practice appears to be followed throughout the territories concerned.

Now every word written in an Annual Medical Report to represent a desire on the part of contributors to state facts of value and interest to the medical community in these circumstances under a variety of conditions is a profitable contribution.

Now every word written in an Annual Medical Report may be held to represent a desire on the part of contributors to pass on established facts of value and interest to the medical profession at large in order that experiences under a variety of conditions may be compared. In these circumstances it is submitted that *uniform methods* might profitably be applied for the collection of the infecting agent and morbidity and mortality data and diagrams graphically illustrating the preparation of maps and the distribution of the disease and presentation of valence of a disease and the methods of attacking a given problem other steps taken to ensure that methods of the application of some such rules of practice can workers assemble facts that are reliable at source shall follow along similar lines only by the application of some such comprehensive in their range and dependable on grounds of comparability for the complete understanding and study of the disease under a variety of differing conditions.

These fundamental requirements might even be supplemented by provision of more extensive opportunities for comparative assessments of results achieved in different territories. For example, it has been noted that the most promising territories are those in which the incidence of the disease is low.

These fundamental conditions might even be supplemented by the provision of more extensive opportunities for investigation by comparative assessments of results achieved by workers in different territories. For example it has been observed that the chemical *neocryl* was tried out on 60 cases in Nigeria† with results most promising. It is known that this drug was tried out in other territories in British Tropical Africa but no mention is made of its use in other Medical Reports. how much more convincing would the experiment have proved comparative results following the use of the drug have been presented by reporting officers in all areas affected. There are few difficulties that cannot be overcome by collective action and so far as *trypanosomiasis* is concerned it should not be impossible to co-ordinate the efforts of all workers engaged in the solution of the problem. Such a scheme would envisage the inter-territorial exchange of epidemiological intelligence at short and regular

† See p. 15 *supra*  
(1204)

↑ See p. 15 *supra*  
(1204)

this trypanosome will alter its character and in particular to determine whether it will come to resemble *T. rhodesiense* and *T. brucei* as a result of its passage through *G. morsitans* another studies the transmission of *T. rhodesiense* through sheep by *G. morsitans* while certain other cognate investigations bearing upon the transmissibility of *T. rhodesiense* through *G. brevipalpis* are directed to ascertain whether a biological test could be evolved to distinguish *T. brucei* from *T. rhodesiense*.

Experiments are also being carried out to see whether the species of vertebrate host influences the rate of infection in flies and the reaction of *T. rhodesiense* to normal human serum, is in course of investigation. Results are not yet conclusive but they suggest that human serum may destroy *in vitro* a strain of trypanosomes capable of infecting the person from whom the serum is obtained if inoculated into him.

Published Papers during 1936 dealing with the problem of Sleeping Sickness in British Tropical Africa included the following —

#### NIGERIA.

NASH T. A. Climate, the Vital Factor in the Ecology of Glossina.—  
(Name of Journal not supplied)

#### KENYA.

SYMES C. B. and McILHON J. P. The Food of Tsetse Flies (*G. swynnertonii* and *G. palpalis*) as determined by the Precipitin Test.—*Bull. Entom. Res.* Dec. 1936

SYMES C. B. and VANK R. T. The Eradication of *G. palpalis* from River Areas by the Block Method.—*Rec. Med. Res. Lab.* No. 7

#### TANGANYIKA.

CORSON J. F. A Note on Hyrax and Dikdiks (*Rhynchotragus*) from areas inhabited by Tsetse Flies.—*Jour. Trop. Med. & Hyg.* 1936—39-12, pp. 125-128

CORSON J. F. Antelopes as Reservoirs of *Trypanosoma gambiense* (Correspondence).—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1936—29-6 p. 690

MACLEAN G. Notes on Trypanosomiasis.—*Quart. Bull. Health Org.* 1936-1 pp. 178-181

#### NIASALAND.

LAMBORN W. A. and HOWAT C. H. A possible Reservoir Host of *Trypanosoma rhodesiense*.—*Brit. Med. Jour.* June 1936.

#### Concluding Observations.

The reader with sufficient patience to have reached thus far may feel inclined to agree that though Colonial Medical Reports provide in the aggregate considerable and valuable information concerning morbidity and mortality experience in connexion with a specific disease and that these contributions combine to extend the boundaries of medical knowledge a lack of uniformity seems to characterize methods of assembling and reporting the relevant details. For example, so far as trypanosomiasis is concerned, in the present survey the reader will have noted marked differences in the volume of information available from different territories and a conspicuous absence of any reference to sex and age incidence. As regards the latter aspect of the problem, details concerning sex, age and local distribution of trypanosome infection are at present meagre or altogether lacking. These facts

# MEDICAL AND SANITARY REPORTS FROM BRITISH COLONIES PROTECTORATES AND DEPENDENCIES FOR THE YEAR 1936

[EIGHTH ANNUAL ISSUE.]

Summarized by P. GRANVILLE EDGE

## WEST AFRICA

### COLONY AND PROTECTORATE OF NIGERIA (1936)

The Colony and Protectorate of Nigeria is the largest of the British West African possessions its approximate area, including the area of the Cameroons under British Mandate being 372,674 sq miles or more than three times that of the United Kingdom. It is bounded on the west and north by French territories on the north-east by Lake Chad, on the east by the Cameroons and on the south by the Gulf of Guinea.

*Introductory*—In September 1936 Dr R. BRIERCLIFFE CMG succeeded Sir Walter B. JOHNSON C.M.G. as Director of Medical Services Nigeria.

*Vital Statistics*—The reader is reminded that though the vital facts relating to *non natives* throughout the Colony Protectorate and Mandated Territory are registered those for *natives* are only registrable when occurring in five prescribed registration areas. These registration areas embrace but a very small part of Nigeria as a whole and within their boundaries little more than *one per cent* of the total population of the Colony and its dependencies are to be found. These facts must be borne in mind when vital data relating to Nigeria are being considered.

*Population figures* for Nigeria as a whole are to be regarded as only approximately true the total mid year population in 1936 and its distribution as given in the Report under review reads *Southern Provinces* 7,793,350 *Northern Provinces* 12,013,767 *Cameroons under British Mandate* 417,245 *total population* 20,224,367.

The vital facts relating to the five registration areas referred to above are as follows—

Area	Mid year population	Births	Birth Rate	Deaths	Death Rate
Lagos†	139,977	3,329	23.8	1,932	13.8
Ebute Metta	20,740	901	43.4	481	22.2
Calabar	17,291	303	17.6	338	19.5
Kano Township	9,204	133	14.5	116	12.6
Port Harcourt	19,409	229	11.8	194	10.0
Totals	206,621	4,895	23.7	3,041	14.7

† In a separate Report, the *Annual Report of the Medical Officer of Health Lagos Town Council* detailed information under a variety of headings is supplied. (1936)



intervals—the information being necessarily compiled on a uniform basis in all territories. Though provision has now been made for the interchange of individual workers whose attention is being devoted to specific aspects of the problem and for periodical conferences between Medical Officers in the various territories for the discussion of matters of general interest, there is still room for a considerable extension of these activities. But whatever system of working may be adopted, or where, it will and must be designed to meet existing circumstances and conditions as the latter undergo change so must the system be amended if it is to function efficiently. For there never was nor ever can be a time in human affairs when systems of work can be expected to remain unchanged. Systems must break with the unfortunate bondage of traditional practice the moment they fail to produce the desired results—no detail of procedure should be retained just because it has been “customary” for work to have been carried out this or that way.

By thinking inquiringly of their daily experiences workers will know how and when to short-circuit the twists and windings of ancient methods of procedure, how to amend and improve components of the complex machinery of organized effort. And out of concentrated thinking will develop creative action which in turn should accelerate progress and lead to discoveries which may revolutionize existing beliefs in so far as some aspects of medicine and specific diseases are concerned.

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Calabar	17 291	303	17.6	338	19.5
Kano Township	9 204	133	14.5	116	12.6
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Totals	206 621	4,895	23.7	3,041	14.7

† In a separate Report, the *Annual Report of the Medical Officer of Health Lagos Town Council* detailed information under a variety of headings is supplied. (1936)

Of the 3,041 deaths recorded, 2,240 were either medically certified as to cause of death, or certified after a coroner's inquest usually after a complete autopsy.

*Infant deaths* registered during the year numbered 683 giving an infant mortality rate of 140 per 1,000 live births. *Stillbirths* in Nigeria are rarely made known—in Lagos 110 were reported.

The non-native population was estimated to number 6,823 and within this group 37 deaths were recorded.

*European Officials resident* numbered 2,164 with an average number resident of 1,560. Of these 100 were invalided and 11 died—three of the deaths were due to *blackwater fever* and 2 to *yellow fever*.

The numerical strength of *African Officials* is not given but 61 were invalided and 24 died. *pneumonia* caused 4 deaths, *pulmonary tuberculosis* 3, *nephritis* 3, *intestinal ailments* 5, *cerebral malaria* 2. Among the invalidings *optic atrophy* was responsible for 23 *respiratory affections* 12.

The average daily strength of the *Nigeria Regiment R.W.A.F.F.* was returned as 3,061—50 were invalided and 21 died. The average daily strength of the *Nigeria Police (Africans)* was 3,621 and of these 29 were invalided and 34 died.

*Maternity and Child Welfare Work*—The demand for additional hospital accommodation for women and children continues, since year by year sees a steady increase in the number of cases seeking institutional treatment. During the year under review a female ward of permanent construction was built at Owerri from funds provided by the Native Administration, a female ward of 24 beds was provided at the Derema Hospital and at the African Hospital, Lagos, two wards of 32 beds were allotted to female patients, and a children's ward of 18 cots was opened. It is said there were 1,983 deliveries in Government and Native Administration Hospitals and Maternity Centres as compared with 1,459 in the preceding year. The various *Religious Missions* maintain 110 totalled as 116 in the Report.) Maternity and Infant Welfare Centres of which 77 are established in the Northern Provinces.

Four Government and three Mission Institutions are recognized by the *Midwives Board* as Grade I training centres, and 6 Government and Native Administration and 9 Mission institutions as Grade II training centres—with the exception of three Grade II centres all are in the Southern Provinces. During the year 7 Grade I *Midwives Certificates* and 12 Grade II were awarded—there are now 71 registered midwives in the country and of the total 31 hold the Grade I Certificate and 40 the Grade II.

In most Government Medical Stations *infant welfare clinics* are established and there are now 94 recognized centres in Nigeria. 4 additional Government and Native Administration Centres were established in the Northern Provinces and 8 in the Southern Provinces during the year while there was also an increase of two Mission Centres in the Northern Provinces.

In Lagos 150 clinics were held and 49 in Ebutte Metta and at these centres the 3,367 infants on the registers recorded 7,870 attendances among these children 178 deaths occurred. Twenty-nine deaths of mothers were ascribed to causes associated with pregnancy and childbirth. Health Visitors paid 35,958 visits to the homes of women

and children and reported 4,227 new cases during the year. The training of Health Visitors is in the hands of a fully qualified and experienced European Health Sister.

*School Hygiene*.—No organized School Medical Service exists in Nigeria outside Lagos. Even in Lagos it is said to be possible only to touch the fringe of school medical work by means of a School Clinic staffed by a trained Health Sister and Dispenser. On the other hand it is observed that close co-operation is maintained between the Education and Medical Departments on the subject of hygiene in schools. Whenever possible Medical Officers carry out the medical inspection of school-children and every opportunity is taken to maintain close contact with teachers and pupils and to stimulate interest in this important branch of Public Health work by organizing talks, cinematograph displays, Health Weeks, School Cleanliness Competitions and so on. Valuable health teaching is also carried out by the various Missions in their schools. The Medical Officer of Health, Umualha (Calabar Province, Southern Provinces) reports that special intensive courses in Hygiene were given to groups of school teachers from Government and Mission Schools in neighbouring provinces.

Reference is made to the medical inspection of school-children conducted by the Medical Officer of Health, Port Harcourt (Owerri Province, S. Provinces) and the findings recorded. In School A a better class school 170 children were examined and in School B an average school 207 pupils were dealt with. The principal findings expressed as percentages were as follows:—

	School A	School B
Development—		
Good—Very Good	70.0	69.1
Fair—Good	27.8	28.0
Poor	2.4	2.9
Skin Affections (including scalp)	19.4	24.6
Enlarged glands (mainly cervical)	49.4	44.4
spleens	10.0	9.1
Throat defects (mainly tonsils)	48.2	24.1

The association of enlarged tonsils and defective diets is commented upon and attention called to the higher incidence of throat defects in School A.

*Public Health Sanitation, etc.*—Two changes of some importance are recorded. The first relates to the appointment by the Lagos Town Council of Dr I. L. OLUWOLE as the first Medical Officer of Health of Lagos—previously Government Medical Officers were seconded for service to the Lagos Town Council. The second change refers to the revised conditions of employment of Junior Medical Officers and aims at extending the opportunities for Africans newly qualified in medicine to acquire clinical experience and training in the larger hospitals under Government. The number of appointments for young African doctors was increased and the period of service reduced.

*Anti-malarial work* continued and though little permanent drainage work of any magnitude was undertaken other work included the reclamation of low-lying areas and swampy ground, drainage tree

planting, distribution of quinine through the Post Offices oiling and spraying of mosquito breeding places etc. The recommendations of the Swamp Reclamation Board envisage the filling and drainage of large tracts of marshland of potential commercial value but at present constituting a definite menace to health. Special measures were directed against the principal vector of yellow fever and efforts were made to control the breeding of *Mansonioides africana* in various large walled cities. It was found that over 90 per cent. of the mosquito infestation of the houses in Ibadan during certain seasons was due to mosquitoes of the *Mansonioides* group.

Methods of sewage disposal continued in the main along lines previously described (see this *Bulletin* 1934 Supp. p. 5\* 1935 Supp. p. 8\* 1936 Supp. p. 10\* and 1937 Supp. p. 15\*). Important discussions took place during the year on the subject of night-soil disposal with special reference to rural areas where sanitation is still in a very primitive state. The water-carriage septic tank latrines in Lagos are an improvement on the former bucket system, but not as satisfactory as a properly designed water borne sewerage system. To meet the needs of private residences schools etc. where the double bucket system is still used, steps are being taken to design suitably simple and economical septic tank installations for adoption. The disposal of refuse by incineration was the usual practice a simple form of incinerator made of dried mud, well within the means of the poorest Native Administration, and reasonably efficient, was introduced during the year.

Particular attention was devoted to the question of public water supplies and especially to sources of supply which with comparatively little expenditure could be rendered thoroughly safe. The only major water works under construction were those at Okene in Kabba Province, Northern Nigeria, estimated to provide a flow of 200 000 gallons per day during the dry season. Other works included the drilling of a large bore well by the Geological Survey Department at Katsina in Northern Nigeria and experimental work concerned with proposals for pipe-borne supplies to various centres and undertaken by the Public Works Department.

Developments in mining and plantation areas resulted in demands for labour being in excess of available supplies. Discussions between mine and plantation managements and the Health Authorities took place regarding medical and health services and the much needed improvement in the housing of labourers and sanitation of the labour camps. In an Appendix appears a Memorandum drafted by Dr P. S. SELWYN-CLARKE and issued by the Department to all the important employers of labour on the housing of labourers. This Memorandum is intended to serve as a guide to the form which health requirements might be expected to fulfil.

Matters concerned with housing and town planning received special consideration with a view to establishing more effective control over building schemes. The appointment of a Town Planning Officer and the nucleus of a town planning cadre were recommended to Government. The team would, among other duties undertake surveys of areas where building schemes were either contemplated or in actual operation and submit recommendations thereon. Good progress is reported in connexion with the layout of Ibadan and suburbs, while

with regard to the layout of villages a scheme based upon that successfully implemented in the Gold Coast has been adopted

Under the heading of *food in relation to health and disease* the importance of providing for the preparation and sale of foodstuffs intended for human consumption under hygienic conditions is emphasized in this connexion it is noted that efforts are being made to improve the conditions of markets in various parts of the country. The usual inspections of premises were carried out and condemned foodstuffs were destroyed. With regard to the incidence of diseases due to *malnutrition* it is said that vitamin deficiency is a not uncommon feature of the dietaries of the poorer classes propaganda aims at advising the people at large of the ill-effects of ill-balanced diets.

Of the four schools in Nigeria for the *training of Sanitary Personnel* three are in Southern and one in Northern Nigeria 29 students were under training at Ibadan 13 at Umudike 6 at Lagos and 17 at Kano. At Umuahia also short refresher courses are provided for Native Administration Sanitary Inspectors

*General Health Education* is conducted through the medium of the Mobile Health Propaganda Van equipped with cinema and loud speaker lectures demonstrations articles of general interest published in the *Nigerian Teacher* etc. Further developments envisage the employment of the Government Broadcasting System and the establishment of rural health units and Village Health Leagues four of the latter units are already established and if these prove successful the scheme will be extended.

*Port Health Work*—Lagos and Port Harcourt remained free from quarantinable diseases but the port of Calabar was declared infected owing to the occurrence of yellow fever. The systematic inspections of ships entering and vessels using harbours were carried out as usual. With regard to *Aerial traffic* satisfactory accommodation for passengers by air is available at the air ports of Apapa (Lagos) and Kano. During the year regulations were brought into force for the control of aircraft crews and passengers in accordance with the terms of the International Sanitary Convention for Aerial Navigation, 1933.

*Hospitals Dispensaries etc*—No new hospitals were built during the year under review but certain African Hospitals were enlarged by the construction of additional wards. In addition to the extensions mentioned in the section *Maternity and Child Welfare* above a new ward block was completed at Enugu and two new wards each of 25 beds were built at Jos.

Details regarding the numbers and types of hospitals bed accommodation volume of work with respect to in patients and out patients are as follows —

Hospital	Beds	Cots	Admissions	Total Treated	Hospital Deaths	Out patients
12 European	144	4	1 118	1 147	18	7 178
Northern Provinces—						
24 African	1 428	40	25 753	27,271	2,847	147,893
Southern Provinces—						
33 African	1,892	143	30 164	31,833		512 170

At the end of the year there were some 300 *Dispensaries* maintained by Native Administrations, 33 new dispensaries having been opened during 1936. At these centres 1,006,833 patients were treated exclusive of the 62,021 cases of sleeping sickness dealt with by Sleeping Sickness Survey Teams.

*Government Prisons*—Average daily number of prisoners was 7,029 and deaths during the year totalled 93. With regard to *lunacy* it is said that Dr CUNYNGHAM BROWNE C.B.E. formerly one of H.M. Commissioners of the Board of Control for England and Wales visited Nigeria and will report upon the care and treatment of lunatics in West African Colonies: the position in Nigeria will be reviewed after receipt and consideration of that Report (see this *Bulletin* 1937 Supp. p. 16\*).

Valuable work continues to be carried out by the *Medical Missions* in Nigeria—leper work is described as "pre-eminently an activity in which the Missions excel." Religious missions maintain 81 stations in the Northern and 49 in the Southern Provinces. Mission Hospitals in the Northern Provinces number 7 and Dispensaries 72, the corresponding figures for the Southern Provinces being 14 and 25 respectively. Of the total 216,507 cases dealt with at all centres, 125,431 were recorded in the Southern Provinces.

With regard to *morbidity experience in Nigeria* it is said that apart from the fact that there is increased prevalence of diseases of the respiratory system between December–February, and of malaria in Southern Nigeria during the period July–September following the heavy rains, there is little evidence of seasonal prevalence of diseases in the territory. The notes which follow briefly summarize the principal references to disease experience in Nigeria during 1936.

*Malaria* continues to provide one of the major public health problems with which the authorities have to deal. breeding places for *A. gambiae* and *A. funestus* are commonly found throughout the country. Mention has been made (see *Public Health* above) of the anti-malarial work undertaken: it remains to say that during the year under review 965 European and 38,671 African cases were treated at the various hospitals, the distribution of these with distinction as to type of infection, whether in- or out-patients, etc. being as follows—

Infection	Europeans		Africans		Totals
	In-patients	Out-patients	In-patients	Out-patients	
<i>P. uax</i>	3	3	22	320	348
<i>P. malariae</i>	1	1	47	3	52
<i>P. falciparum</i>	212	579	1,508	20,371	22,671
Unspecified	58	137	668	15,731	16,565
Totals	274	720	2,245	36,425	39,669

Five deaths occurred among the European and 55 among the African cases. Thirty cases of *blackwater fever* were treated: of the total, 11 occurred among Europeans with 1 death and 19 among

Africans with 2 deaths. At Native Administration dispensaries 57 092 cases of *malaria* were treated.

*Yellow Fever* was responsible for 4 European cases and 3 deaths no African cases were recorded. A brief historical survey of yellow fever in the non native community during the past three years is provided despite the apparent paucity of recognized cases it is clear that the scattered nature of yellow fever infections makes the disease a definite public health problem. The usual anti mosquito measures are directed against the principal vector *Aedes aegypti* domiciliary visits are regularly made and domestic collections of water inspected for mosquito breeding etc. The work of the *Yellow Fever Unit* during the year was of a routine nature and mainly concerned with carrying out mouse-protection tests on suspected sera of 119 samples of sera examined 40 gave positive and 14 inconclusive reactions.

*Smallpox* in severe form occurred during 1936 with Northern Nigeria again chiefly affected (see this *Bulletin* 1937 Supp p 17\*) the distribution of cases and deaths being in the Colony 17 cases with 2 deaths Southern Nigeria 514 cases with 53 deaths and Northern Nigeria 4,352 cases with 556 deaths. Extensive vaccination campaigns were instituted 41,585 vaccinations being performed in the Colony 436,291 in the Southern Provinces and 754,331 in the Northern Provinces. It is stated that according to available records *cholera* has never visited Nigeria. Human and rodent *plague* remained absent during the year. *Typhus* was added to the list of notifiable diseases in accordance with the requirements of the International Sanitary Convention for Aerial Navigation 1933.

Southern Nigeria remained free from *cerebrospinal meningitis* during 1936 but 43 cases with 36 deaths were notified in Northern Nigeria. The usual preventive measures were applied. Epidemics of the disease are usually associated with the dry season when natives tend to crowd together in their villages at a time when the ground is too hard or unproductive to permit of farming when the rains commence overcrowding is lessened.

Of *enteric fever* it is stated 37 cases were notified with 8 deaths. In the Hospital Returns there are mentioned 48 cases and 13 deaths of the total 9 were Europeans (8 in patients) and 39 Africans (in patients) while all the deaths occurred among Africans. As regards types of infection among the hospital cases 25 were typhoid 5 paratyphoid A 8 paratyphoid B and in 10 cases the type of infection was not defined. At the various laboratories where 153 samples of sera were examined for the specific agglutinins of the enterica group 18 gave positive reactions no details as to types of organisms are supplied except in the case of the Yaba Laboratory where among 65 sera examined 5 were positive for *Bact typhosum* and 1 for *Bact paratyphosum A*.

*Dysentery* is still an important cause of ill-health amongst all sections of the community. At the various hospitals 5 403 cases were treated distributed as to 3 129 amoebic 126 bacillary and 2 148 infection undefined. There were 84 non fatal European cases and 5,319 African cases with 135 deaths. In addition 10 788 cases were dealt with at Native Administration Dispensaries. Among 4,206



specimens of stools examined at the Lagos Laboratory 21 contained *E. histolytica* 30 *Bact. dysenteriae* (Flexner) 3 *Bact. dysenteriae* (Sonne) and 2 *Bact. dysenteriae* (Schmitz) while among 5,837 specimens dealt with at Outstation Laboratories 369 contained *E. histolytica* 26 *Bact. dysenteriae* (Flexner) and 2 *Bact. dysenteriae* (Sida).

The magnitude of the problem of *trypanosomiasis* in Nigeria is discussed in considerable detail in a separate report contributed by Dr M D MacQUEEN Acting Deputy Director Sleeping Sickness Service and presented as an Appendix to the Annual Report under review. As that special report will be reviewed at some length in the *Tropical Diseases Bulletin* references to the work on the present occasion are confined to mention of the barest details. During the year under review 417,495 persons were examined by the Sleeping Sickness Teams and of these 47,550 were found to be infected. In addition 10,450 cases were diagnosed and treated at field dispensaries and 4,021 at general medical stations bringing the total for the year to 62,021 cases. Special research work is dealt with at length in the special report mentioned above under such headings as the Testing of Experimental Drugs, The Effect of Exposing Premunized Animals to Fresh Infections, Entomological Work, etc. (see also this *Bulletin* 1936 Supp. pp. 13\*-14\* and 1937 Supp. p. 17\*). An enactment entitled "An Ordinance to make Provision for Measures for Preventing the Spread of Sleeping Sickness and for the Compulsory Treatment of those Persons Infected with Sleeping Sickness" and the expansion of schemes for the concentration of populations from scattered farm hamlets in infected areas into larger village units in protected areas (see this *Bulletin* 1937 Supp. p. 17\*) are among the steps taken for the more effective control of the disease. Hospital Returns show 3 non-fatal European cases and among Africans 1,496 in-patients and 2,717 out-patients with 69 deaths.

Tuberculosis has been added to the list of compulsorily notifiable diseases. Though at present dependable data are lacking, it is believed the mortality due to the disease—principally *pulmonary* in origin—constitutes a serious menace. Hospital Returns supply the following details relating to patients treated during 1936 —

Type	Europeans			Non-Europeans		
	In-patients	Out-patients	Deaths	In-patients	Out-patients	Deaths
Pulmonary	4	2	1	2,333	404	156
Other Forms	—	—	—	305	235	36

At Native Administration Dispensaries 1,008 cases of pulmonary tuberculosis were treated.

At the various Laboratories where 1,014 samples of sputum were examined 202 were positive for *Mycobacterium tuberculosis*. *Pneumonia* and other respiratory diseases are also responsible for a serious disability and heavy loss of life as may be gathered from the following data extracted from Hospital Returns —

Item	Europeans			Non Europeans		
	In patients	Out patients	Deaths	In patients	Out patients	Deaths
Bronchitis	21	167	—	1 177	40,369	75
Pneumonia	8	—	—	1 706	785	485

At Native Administration Dispensaries 2,814 cases of pneumonia were treated.

*Helminthic infections* are common steps taken with a view to effecting improvement include educational propaganda sanitary disposal of night-soil and refuse protection of water supplies and of food from flies etc Turning again to the classified returns it was noted that the following cases were dealt with at various centres during the year —

Item	European Hospitals	Non-European Hospitals	N.A. Dispensaries
Ascariasis	19	24 642	51,855
Taeniasis	18	8 658	23 611
Ankylostomiasis	8	2,807	3 080
Dracontiasis	—	1 716	8,334
Schistosomiasis	3	927	1 716
Filariasis	31	450	7

Males seeking treatment are in excess of females owing to the disinclination on the part of women to attend for advice and medical treatment Infections with *Schistosoma haematobium* are said to be much more common than those due to *S. mansoni* at the various laboratories where 10 193 faecal specimens were examined 39 contained *S. mansoni* but *S. haematobium* was found in 260 out of 8 670 samples of urine dealt with.

*Leprosy*—There appear to be 10 Leper Colonies and Settlements maintained by Government and Native Administrations in the Northern Provinces 10 in the Southern Provinces and 1 in the Colony together with those maintained by various Missions. At all these centres there were 5,299 resident lepers but it is noted that in addition considerable outpatient treatment for non-segregated patients is provided by hospitals and dispensaries throughout Nigeria. Hospital in patients (Africans and non Europeans) numbered 600 and out-patients 1,910 while Dispensary patients numbered 2,826

*Veneral Diseases*.—It is said that apart from the improvement in the hospital and dispensary facilities for the treatment of gonorrhoea and syphilis little progress has been made in dealing with the V.D. problem. The incidence of gonorrhoea is excessive but syphilis is most prevalent in the North The numbers of patients treated in hospitals and dispensaries are given as syphilis 18 432, gonorrhoea 18,576 soft chancres 2 604 and venereal bubo 836 in addition at Native Administration Dispensaries 32 671 cases of syphilis and

20,838 cases of gonorrhoea were treated. The Seamen's Clinic for Venereal Diseases at Apapa Quay (Lagos) continued to do useful work. 2,207 patients were treated during the year.

*Yaws* occurs in most parts of Nigeria. It is said to be a disease of the "bush" rather than of the towns with particularly high incidence in the Southern Provinces. In some areas including Mandated Territory special campaigns were directed against the disease from rural dispensaries. At hospitals and dispensaries 110,688 cases were treated and at Native Administration Dispensaries 83,342 cases.

*Other diseases* commented upon in the Report under review and calling for brief mention include the following. Twenty-eight positive cases of *canine rabies* were confirmed by pathological examination; the specimens were forwarded from all parts of Nigeria, the largest number seven, being received from Bamenda in the Cameroons. Prophylactic treatment with an anti-rabic vaccine was administered to 40 Europeans and 287 Africans. Two deaths of Africans were ascribed to rabies. It is said to be difficult to assess the amount of ill health in the general population attributable to insufficient or unsuitable foods. Hospital returns show 26 cases of beriberi, 33 of scurvy, 79 of rickets, 25 of pellagra and 441 of hypovitaminosis. No special preventive measures were applied against filariasis, a disease which is not an important cause of ill-health in Nigeria. Infection with *L. loa* is more common than with *W. bancrofti* according to hospital returns which show 19 cases of the former infection and 2 of the latter among Europeans, the corresponding figures for Africans being 303 and 57 respectively. Outbreaks resembling dengue and also showing some resemblance to rubella and glandular fever in both Europeans and Africans were reported from several northern towns. Among Europeans 33 cases of dengue and 19 cases of glandular fever are recorded; among Africans 10 cases of dengue and one of glandular fever are recorded. *Relapsing fever* is not mentioned in the text but it is noted that 173 cases were treated at Native Administration Dispensaries.

A Report on the Medical School, Ibadan and Lagos and the School of Pharmacy is presented in an Appendix.

*Scientific*—The volume of work dealt with during the year at the various Medical Laboratories in Nigeria is discussed at length in an Appendix to the Annual Report under review. Numbers of specimens of blood, stools, sputum, etc. received for examination and findings recorded are presented in tabular form; the principal of these have been referred to in the preceding notes.

*Financial*—Omitting expenditure on Native Administrations, expenditure on Medical Services during 1936 totalled £339,038.

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## GOLD COAST COLONY (1936)

The Gold Coast Colony with Ashanti, the Protected Northern Territories and Togoland under British Mandate is situated on the Gulf of Guinea. It is bounded on the west by the French colony of the Ivory Coast, on the east by the French Mandated Togoland on the north by the colony of the Upper Volta and on the south by the sea. The area of the Colony is 23,837 sq miles, of Ashanti 24,379 of the Northern Territories 30,486 and Togoland 13,041 the total being 91,843 sq miles.

*Introductory*—In continuation of the procedure adopted in previous Annual Reports the Report under review supplies a summary accounts of the more important Public Health experiences in 1935 and 1936.

*Vital Statistics*—The estimated mid year population of the Gold Coast and its Dependencies is supplied in the following detail—

	Gold Coast and Dependencies	Togoland	Totals
Africans	3 264 765	349 179	3 613 944
Non-Africans	3 139	43	3 182
Totals	3,267 904	349,222	3 617 126

Dependable vital statistics are available for 35 registration districts only (see this *Bulletin* 1937 Supp p 21\*) The total population of these districts at the middle of the year is given as 325 433 registered births 11,222 and deaths 8 002 the birth and death rates being 34.5 and 24.5 per 1 000 respectively. In previous issues of this *Supplement* mention has been made of the variations characterizing birth and death rates in these 35 registration districts. During 1936 the same striking differences are observed, with birth rates ranging between 13.4 and 55.3 per 1 000 and death rates between 11.9 and 78.9 per 1 000. In the six principal towns in the Colony having an aggregate population of 184 147 birth rates ranged between 19.6 and 41.8 death rates between 13.5 and 30.7 per 1 000 population and infant mortality rates between 48 and 139 per 1 000 births. No infant mortality rate can be calculated for the Colony as a whole.

The General European Population in 1936 totalled 4,328 persons. Government Officials resident numbered 865 with an average number resident of 607 during the year 48 officials were invalided and 8 died. Six cases of invaliding were due to purely tropical causes. Among the remaining 3 463 Europeans (Non-Official) 91 invalidings and 20 deaths were recorded.

African Officials resident numbered 3 751 the average number resident 3 623 invalidings 24 and deaths 14.

*Maternity and Child Welfare Work*—This progressed along satisfactory lines throughout the year despite the fact that the mass of disease and treatment loom so prominently and combine to make true preventive work so difficult. All station hospitals carry on this work and are established centres for education and propaganda activities in general may be described in three main categories as below—

Authority and Centre	Attendances	
	Children	Expectant Mothers
<i>Government—</i>		
Accra	18,864	600
Kumasi	13,466	10,781
Totals	32,330	11,381
<i>Red Cross—</i>		
Cape Coast	10,384	4,677
Sekondi and Shama	8,236	4,779
Korloridua	29,365	7,563
Totals	47,985	17,019
<i>Missions—</i>		
Djodja (Roman Catholic)	2,650	55
Eikwe	16,312	—
Kpandu	8,734	—
Totals	37,695	55

At the Princess Marie Louise Welfare Centre at Accra 569 in-patients were dealt with and at Kumasi 699. It is pointed out that as there is no maternity hospital at Kumasi a certain number of confinements are conducted at the welfare centre during the year such cases numbered 84.

An Appendix to the Report under review describes in detail the year's work at the *Maternity Hospital Accra* where a new hostel for pupil midwives was opened in April, and provisions have been made for future extensions of buildings in other directions. A steady increase is reported in the volume of district work carried out by trained midwives and this has had the effect of reducing admissions to the hospital. Of the 1,347 patients admitted 629 were labour cases, 527 live births were recorded and there were 74 infant and 53 maternal deaths. Among out-patients were 3,828 new ante-natal, 644 post-natal and 186 cases attending for other conditions attendances recorded totalling 18,696.

At this Hospital there were 21 resident pupil midwives in training at the end of the year. 4 midwives obtained the certificate of the Central Midwives Board during 1936.

Nine nurse-midwives and 14 subsidized midwives were employed by the Health Branch, and these women dealt with 1,830 confinements. (A subsidized midwife receives a Government grant of £3 per month to enable her to establish herself in private practice in a prescribed area.) A successful effort was made during 1936 for subsidies to be paid to midwives at Government rates in two important towns under the Native Administration. As a result of these combined activities and endeavours it is said that the services of trained midwives are being increasingly sought for and that the native midwife especially in such centres as Accra etc. is rapidly disappearing from practice.

*School Hygiene*—Nothing in the nature of a school medical service exists and observations under this heading are for all practical purposes identical with those summarized previously in these pages (see this

*Bulletin* 1936 Supp p 18\* and 1937 Supp p 22\*) Co-operation with the Education Department continues hygiene is taught in all schools and its importance emphasized during the visits of inspection by all Officers. Articles on health subjects appeared frequently in the pages of the *Teacher's Journal*. All observers are said to have commented upon the rapid decline in the spleen rates in the older grades of school children.

*Public Health Sanitation etc*—Dr D DUFF Director of Medical Services observes that improved financial and economic conditions contributed in part to arrest the serious set back in health recorded in 1935 (see this *Bulletin* 1937 Supp p 22\*) though it is added that the tide of immigration increased and continued to bring undernourished and diseased elements which serve in many respects as a danger to the general health of the Colony. The opening up of trade routes and increased transport facilities also play an important rôle in the dissemination of disease. In the registration areas (see above *Vital Statistics*) an improvement in the health of the African community is reported but in the rural areas conditions remain unsatisfactory and these react unfavourably upon the health of the people in the larger centres of population for where as on the Gold Coast there is a constant movement of the population between the country and the towns it is impossible to exclude the introduction of certain diseases from the uncontrolled rural areas. *Malnutrition* is a subject of comment and it is said that in some areas in the Northern Territories the people are undoubtedly under nourished since owing to a combination of unfavourable local factors intensive farming is impossible.

*Sanitary conditions in the rural areas* and in the areas surrounding the mines are said to be deteriorating though it is reported that in the Northern Territories the Native Administration has made such an excellent beginning that a satisfactory sanitary standard should be reached in the near future until necessary legislation is passed little can be done to improve matters in other areas. Little change in previously described methods of *sewage or refuse disposal* can be reported. The sea disposal of night-soil in Accra continues as a nuisance of the first order a water-carriage sewer borne system will become inevitable in the near future. It has become increasingly difficult to provide an adequate number of sanitary pit latrines in the smaller towns even when these are subject to the provisions of the Towns Ordinance. In the Northern Territories a system for the composting of organic refuse and excreta is gradually being evolved.

The *pipe-borne water supplies* to the seven centres of population previously described continued to function satisfactorily throughout the year (see this *Bulletin* 1937 Supp p 23\*)

Extensions of the Cape Coast supply were commenced to Saltpond and Elmina and the work on the piped supplies for Koforidua made steady progress. public health in these centres and in villages along the pipe lines will benefit enormously on the completion of these schemes. A comprehensive survey of the possibilities for water supplies in the Northern Territories was completed no detailed information is yet available.

*Drainage* work during the year was mainly concerned with maintenance and repair of existing constructions. *Anti-malaria* schemes

In the Gold Coast are faced with unusual difficulties—4 *gambias* and *A. funestus* are universally present and few areas fail to provide suitable nurseries for them and the clearing of heavy forest merely opens fresh fields for their propagation. Little extension of permanent drainage schemes is recorded steady progress is reported in filling low-lying areas of limited extent the clearing of brush and undergrowth, etc.

*Labour conditions* are described at some length and brief reference has been made in these notes to the flood of immigration which continued unabated during the year at the disinfecting station outside Kumase 38,106 immigrants were treated other stations provide similar indications, for immigration over land frontiers is immeasurably greater than via the coastal ports. The situation in the mining areas is discussed in considerable detail in a special Appendix to the Report under review and contributed by Dr H P FOWLER Senior Health Officer Western Province. On 11 mines 547 Europeans and 19,382 Africans are employed. The rapid development of mining activity has produced problems of major sanitary importance with which existing organization and legislation have been unable to deal. A good deal of the preliminary work of establishing sanitary control was accomplished during the year and these activities continue. Precise knowledge of the hazards of mining upon the health of African employees is lacking and Dr Fowler suggests the appointment of a small representative Committee to undertake a complete investigation of the industry.

Under the heading of *housing and town planning* a decided impetus in the building of good class houses in the larger centres of population is reported. On the other hand the slum areas in some of the larger towns are extensive and their clearance a matter of public health importance. The *dietaries* of the general bulk of the population are lacking in proteins animal fats, fresh fruits and vegetables. No true *dairies* exist and the African mother is defeated in procuring a suitable breast-milk substitute for her infant. In all centres wherever Health Staff is stationed food products and premises are regularly inspected.

The *School for Sanitary Inspectors* in training continued to function throughout the year. Health Visitors are trained by Medical Officers and trained European nursing sisters at the various welfare centres.

*Recommendations for future work* include slum clearance and re-housing at Accra provision of water supplies to Takoradi and Nkwam improvement of supplies to Ho with extension to the Leper Settlement public health legislation for townships and rural areas contagious diseases hospital and quarantine station at Takoradi and quarantine station at Accra re-housing of lepers at Accra and Sekondi, etc.

*Port Health Work*—No Gold Coast port was declared in quarantine during the period under review. Ships entering Accra numbered 612 and 5,021 immigrants and dock passengers were landed, the corresponding figures for the port of Takoradi being 649 and 3,984 respectively. The rat vulnerability of buildings in the port of Accra was again a source of anxiety plague is a distinct menace and appropriate rat-proofing a matter of urgent consideration (see this *Bulletin* 1937 Supp. p. 24). At the Bacteriological Laboratory the carcasses of 2,372 rats were examined but none was found infected with *P. pestis*.

*Anti-amaryl aerodromes* at Accra and Takoradi will soon be ready for regular traffic it is not yet possible to assess the degree of difficulty which will be experienced in their efficient sanitary control.

*Hospitals Dispensaries etc*—A new 32 bed hospital was completed at Tarkwa to the European Hospital, Kumasi a new block was added and minor structural changes carried out at the African Hospital. In the Tamale area the Dagomba Native Administration with praiseworthy public spirit has undertaken to assist in building a camp to accommodate about 40 patients. At the Gold Coast Hospital Accra the need for additional accommodation to deal with cases of such infectious diseases as enteric dysentery etc grows more urgent each year while at both Kumasi and Tamale increased accommodation is urgently required. Plans have been prepared for the construction of new hospitals at Cape Coast and Sekondi. The distribution of existing treatment centres bed accommodation etc is as follows —

Locality	European Hospitals		African Hospitals		Dispensaries
	Number	Beds and Cots	Number	Beds and Cots	
Eastern Province	1	18	11	488	13
Central	1	5	5	148	7
Western	2	27	4	119	6
Ashanti	1	12	4	204	4
Northern Territories	1	6	6	115	8
Togoland	—	—	2	41	3
Totals	6	68	32	1 115	41

At these Institutions 311 211 patients were treated during the years among them 27 081 in patients hospital deaths totalled 2 082. A Hospitals in the three chief centres of population 8,541 in patients were dealt with distributed as follows —*Accra* Europeans 315 Africans 3,327 *Sekondi and Takoradi* Europeans 354 Africans 1,328 and *Kumasi* Europeans 228 Africans 2,989

In addition to the 41 established *dispensaries* (see above) there are 11 dispensaries under construction of which 7 are in the Northern Territories where under the energetic guidance of the Chief Commissioner the sound development of the Native Administration is a notable feature

Welfare work at the *Mission Hospitals* has briefly been referred to under the heading *Maternity* above. It remains to say that at the large 56-bed hospital maintained by the Basel Mission at Agogo 99 European and 976 African in patients and 5 810 out patients were treated.

The notes which follow briefly summarize the more important references to disease experience in the Colony during the year under review

*Malaria* again proved the most important and widespread cause of ill-health most of the labour inefficiency and loss of time are still due to this disease and in every febrile condition malaria has first to be carefully excluded before a diagnosis can safely be made. During



the year 25 130 cases were dealt with or approximately 9 per cent. of the total cases treated for all causes. According to Hospital Returns 20 675 patients were treated for malaria 1 832 being in-patients. The distribution of types of infection among the 20 675 hospital cases was *subtertian* 15 442, *benign tertian* 650 *quartan* 115 *cachexia* 57 undefined 4 394 and *blackwater fever* 17. Hospital deaths due to malaria numbered 64 and of these 3 were ascribed to *blackwater fever*. Anti-malaria measures have been the subject of brief mention in the section *Public Health* above but mention must be made of the scheme for the distribution of quinine through post offices and postal agencies (see this *Bulletin* 1937 Supp. p. 25\*). The demand for the tablets increases propaganda methods describing the life-saving properties of the drug are being continued. At the Accra Laboratory 5 160 blood films were examined for the presence of parasites of various kinds and of these 3 740 gave negative results. Among the 1 425 positives, 1 328 contained malaria parasites types are not differentiated.

No case of *plague* was reported during the year the threat exists at the major ports of Accra and Takoradi (see *Port Health*). *Cholera* so far has not made its appearance in the Colony. An outbreak of *smallpox* occurred in the Western Province of Ashanti with 59 cases and 9 deaths prompt and thorough action succeeded in stamping out the outbreak in a few weeks. During the year 454 635 persons were vaccinated. No cases or deaths were reported as due to *cerebro-spinal fever* or *relapsing fever*. With regard to the latter disease it is said that the elaborate de-lousing facilities available have proved most successful. 38 106 immigrants were dealt with at the station near Kumasi.

What appears to be the first recorded case of *tropical typhus* in the Gold Coast is reported. The case is described in some detail in an Appendix to the Annual Report by Dr G. L. ALEXANDER who also appends the laboratory report which states—

"Blood—Widal 6-11-36 Agglutinates Typhoid H 1-25 No agglutination typhoid O Para A B C group salmonella.

Weil Felix—Agglutinates Proteus OX19-1-1280.

Widal 7-11-36—Agglutinates Typhoid H 1-40

Weil Felix—Agglutinates Proteus OX1-19-2560

This appears to have been a case of *tropical typhus*.

Other infectious diseases reported included 17 cases of *diphtheria* with 5 deaths. At the Accra Laboratory *C. diphtheriae* was isolated from 11 cases of clinically diagnosed diphtheria. Throat swabs were also examined from 212 African school-children virulent strains of *C. diphtheriae* were isolated from two children—one of whom was Schick positive, the other Schick negative at the time and avirulent strains were isolated six times. There were also 441 non-fatal cases of *measles* 6 of *scarlet fever* 293 of *influenza* and 12 of *acute poliomyelitis*.

As regards *yellow fever* three fatal cases in Africans were reported. The distribution of these cases was wide one each in the Colony Ashanti, and the Northern Territories respectively and again the view is emphasized that reported cases must represent but a small percentage of those actually occurring throughout the whole country since the whole of the Gold Coast is an endemic area, and knowledge of the general incidence of the disease is slight. Mosquito control at

present is limited to the ports the larger population centres and to villages on the important trade routes and requires to be extended. No town in the Gold Coast can be defined as *Aedes* free and sporadic cases must be anticipated from time to time (see also *Port Health* above). Reference is again made to the possibility of the existence of a jungle type of yellow fever in this connexion the following results (FINDLAY) of the examination of Gold Coast monkeys for immune bodies are of considerable interest —

Species	No. of sera examined	No. of sera protecting	No. of sera not protecting
<i>Cercopithecus</i> sp.	1	—	1
<i>Erythrocebus palas</i>	1	—	1
<i>Colebus vellerosus</i>	3	2	1
<i>C. badius badius</i>	6	3	3
<i>Procolobus badius waldroni</i>	4	2	2
Total	15	7 nearly 50%	8

In an Appendix Dr G W VAUGHAN describes an interesting fatal case of yellow fever in an African child aged one year.

*Trypanosomiasis* continues to be a source of anxiety. During 1936 cases dealt with in hospitals (in- and out patients) were 4 820 (10 were Europeans) as compared with 2 885 in 1935 and registered deaths due to this cause were 182 as against 110 in the preceding year. Official returns show increased incidence in villages along roads traversed by boys from the Northern Territories seeking work in the mines. For example at Dunkwa where 38 cases were seen 28 occurred among former residents of the Northern Territories—at Mpraeso 76 per cent of the 68 cases recorded were Northern Territories immigrants. These facts are significant. The increase in imported cases may be both actual and due to increased faith on the part of the people in the efficacy of modern treatment. It is said that as yet there is little sign of any increase in the virulence of the infecting strain.

In the Northern Territories the areas originally cleared with a view to tsetse control have been carefully maintained. It is regretted, however that owing to the difficulty of obtaining an Entomologist the recommendation of the *Committee on Human Trypanosomiasis* which met in July 1935 (see this *Bulletin* 1937 Supp p 26\*) to conduct a detailed survey in the Northern Territories and in Ashanti could not be implemented. The difficulty has since been overcome and it is hoped to undertake an extensive survey in 1937.

*Fevers of the enterica group* were declared infectious diseases under the Infectious Diseases Ordinance during the year a step taken in order to ensure proper control of cases and contacts. Altogether 107 cases were dealt with at Government Hospitals with 7 deaths the distribution of types of infection being *Bact typhosum* 85 *Bact paratyphosum* A 6 B 1 C 11 and in 12 cases the type of infection was not defined. The majority of the cases occurred in the Eastern Province 33 of them in Nsawam alone here the water

supply is from the grossly polluted river Denam, which is washing and bathing place and the ultimate destination of all surface drainage. Certain of the cases clinically resembled yellow fever and full bacteriological examinations had to be carried out before this disease could be excluded.

Diseases of the dysentery, diarrhoea and enteritis group occupied the third place in the list of killing diseases in the Gold Coast. Hospital cases (in- and out-patients) of dysentery dealt with during the year numbered 1,840 of these 401 were in-patients and 56 died. Amoebic dysentery may be considered to be at least twice as prevalent as the bacillary form of the disease pointing to a fly-borne infection as a common source of trouble among hospital cases. During 1936 a serious outbreak of bacillary dysentery occurred at Begoro a large rural town in the Eastern Province and accounted for the deaths of 115 young children already suffering from measles. Hospital Returns show that 4,718 patients (in- and out-patients) were treated for diarrhoea and enteritis and of the total 480 were in-patients with 58 deaths. At the Anna Laboratory 2,715 stools were examined microscopically and 5 *Kistlovicia* identified in 36 cases among 30 stools bacteriologically examined. Bari dysenteriae were isolated 23 times. Shiga twice and Sonne's bacillus once.

Tuberculosis (all forms) killed 853 persons during 1936 the pulmonary form of the disease being responsible for over 80 per cent of the total deaths recorded. Deaths of males numbered 632, the excess of male deaths being due to the fact that the majority of immigrant labourers are of this sex. At Government Hospitals 1,558 cases (in- and out-patients) were treated and of these 1,366 were cases of the pulmonary form of the disease. 551 were in-patients and of these 437 were pulmonary cases causing 221 out of the 248 tuberculous deaths occurring in hospitals. It is hoped in the near future to commence in Tarkwa an investigation into the incidence of silico-tuberculosis. Next to tuberculous pneumonia is considered the most important killing disease. In- and out-patient cases totalled 1,035 and among the 524 in-patient cases 159 deaths occurred. No fewer than 12,306 cases of bronchitis and broncho-pneumonia were also treated at the various hospitals. 513 were in-patients and 83 died.

*Helminthic Diseases*—The relative importance of various types of infestation may be gathered from the following details extracted from Hospital Returns—

Disease	In patients	Deaths	Out patients
Teniasis	115	3	2,494
Ascariasis	100	12	1,708
Ankylostomiasis	841	—	1,325
Dracunculiasis	187	—	858
Chenostomiasis	199	—	713

By comparison with 1935 experience while the order of incidence of these infestations remains unchanged an increase is noted in the number of cases under all titles and this is especially noticeable in the case of ankylostomiasis and schistosomiasis.

*Leprosy*—The Leper Settlements at Accra Ho Kumasi Yendi and Sekondi continued to function throughout the year. The principal Settlement is at Ho where 414 lepers were accommodated during 1936 of these 64 were new and 42 old cases admitted 12 were discharged and 8 died, and at the end of the year 310 still remained in the Settlement. Dr H. C. ARMSTRONG Medical Officer in charge contributes a report of the year's work at the Ho Settlement. The re-housing of the lepers at Sekondi and at Accra is overdue at these centres lepers are accommodated in the respective Contagious Diseases Hospitals. According to Hospital Returns 1,503 lepers were dealt with during the year.

In an Appendix to the Annual Report under review Dr E. MUIR Medical Secretary of the British Empire Leprosy Relief Association, provides a full and valuable survey of anti-leprosy work in the Gold Coast with suggestions for its further development. As so far no satisfactory estimate of the incidence of the disease is available Dr Muir recommends sample surveys in prescribed areas sufficiently extensive in range to provide the data necessary for the framing of an effective and comprehensive anti-leprosy programme suggestions as regards the establishment and development of leprosy institutions on sound lines are also submitted in some detail.

*The Venereal Diseases Clinic* at the Gold Coast Hospital Accra continued its useful work throughout the year the record of work shows that 988 new cases male and 249 new cases female were treated and the total of old and new cases under treatment for both sexes was 1,535. Hospital Returns (in and out patients) show that 870 cases of *syphilis* 4,933 of *gonococcal infections* 11 of *granuloma venereum* and 310 of *soft chancre* were treated during 1936.

As regards *Yaws* it is said the disease accounts for the greatest percentage of cases seen at the various hospitals and dispensaries. During the year under review 77,735 cases in all stages were seen 5,822 of these being dealt with at the Infant Welfare Centres. The incidence of the disease closely corresponds with the standard of sanitation in various localities—the florid secondary form is rarely seen in comparatively well-sanitised centres but is common in the rural backward areas.

*Other diseases* mentioned in the Report include the following. A few cases of *filariasis* and *dengue* are seen from time to time. The latter disease rarely assumes epidemic proportions it is believed a dengue-like febrile disease dependent for its propagation on biting flies of the genus *Culicoides* exists in the forest belt though proof is so far lacking. The outbreak of *canine rabies* reported in 1935 (see this *Bulletin* 1937 Supp. p. 28\*) continued into 1936 and the whole of the Gold Coast remained an infected area. Cases reported were fewer—5 cases with 3 deaths appear in the Hospital Returns—and incidence is said to be declining. At the Laboratory 15 brains of dogs out of 32 examined showed *Negri* bodies.

*Scientific*—Dr G. ROBINSON Senior Pathologist contributes his usual detailed Report of the work carried out at the Accra Laboratory. Routine work included the examination of 5,165 bloods for the presence of parasites 3,175 Wassermann tests of which 41 per cent gave positive results the examination of 3,023 faecal specimens and 1,452 samples of urine 518 bacteriological examinations of water samples.

etc. The findings recorded as the results of the principal of these examinations have been referred to in the preceding notes under various disease titles.

The Analytical Chemist reports that 2,291 samples of various kinds were dealt with during the year the Customs Department supplying 1,266 of the total samples received for examination.

*Financial*.—Actual expenditure on Medical Department services amounted to £312 413 a sum which represents 13·4 per cent. of the total expenditure for the Colony during 1936

### SIERRA LEONE (1936)

The Colony and Protectorate of Sierra Leone has an area of nearly 29 000 sq miles, a little less than that of Scotland. The sea coast is 210 miles long and extends from Kragbo on the border of French Guinea to the Mano River on the Border of the Republic of Liberia.

*Vital Statistics*.—Year by year the Registrar-General continues to extend the system of registration (see this *Bulletin* 1936 Supp., p 25\* and 1937 Supp. p 29\*) in the Colony and Protectorate. There are now in addition to the Chief Registrar Deputy Registrar and Chief Registrar's Clerk 27 Registrars (chosen from Medical Officers and educated but non medical citizens) and 23 Deputy Registrars (these posts being filled by dispensers and educated citizens). It is again pointed out that at present figures cannot be regarded as a true assessment of the state of the public health. For Freetown alone where control is rigid and registration reasonably complete, the data are dependable also a crude estimate of the mid-year population is possible in the case of Freetown only other population figures repeating the facts obtained during the Census of 1931. The relevant data read as follows —

Area	Popula- tion	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I M R.
The Colony	103,378	2 857	24 5	2,460	24·0	584	230
Freetown	62 314	1 457	23 0	1,297	20 8	303	210
The Protectorate	1 072 058	2,455	?	733	?	146	?

The above facts are supplied by the Chief Registrar an appointment held *ex officio* by Dr J A A DUNCAN M.C. Assistant Director of Medical Services (Health) who wisely observes of registration efforts in Sierra Leone, "The machinery exists and only time and custom will induce the African to register and this object is better obtained by persuasion than coercion. Dr Duncan and his subordinates are to be congratulated on the success which is attending their interesting endeavours in this important branch of public health work.

*European Officials* resident numbered 211 with an average number resident of 145. No deaths occurred but 16 invalidings were recorded, 2 due to *neurasthenia* the remainder to 14 different causes. *European non-officials* resident were 604 with an average number resident of

356 Of these 21 were invalided and 4 died Only one invaliding and one death could be directly attributed to tropical diseases

There were 860 *African Officials* resident with an average number of 930 Two deaths and 11 invalidings occurred none attributable to tropical diseases

The average strength of *African Troops* (R W A F F) was 369 One death occurred and during the year 275 men were on the sick list. The total strength of *African Police* was 268 Four died and 174 were sick at some time during the year

*Maternity and Child Welfare Work* continued to make good progress during the year despite the fact that no increase in accommodation was possible To the Maternity Ward of the Connaught Hospital 607 patients were admitted 402 gave birth in the Ward and 6 maternal deaths occurred In addition 205 women were treated in the Ward for various ailments A new Maternity Training Centre with 4 private wards accommodation for 40 patients ante and post natal and Infant Clinics is to be erected

The voluntary training of midwives commenced two years ago has continued to make satisfactory progress two trainees have obtained the local C M B and six others are still in training

At the Ante Natal Clinic 716 women were on the register as new cases and total attendances numbered 5,510 Women delivered of their babies in the Maternity Ward of the Connaught Hospital and mothers delivered in their own homes are advised to attend the *Post Natal Clinic* for supervision advice and necessary treatment During the year 477 such cases were dealt with and 1,157 attendances recorded. Twice a week throughout the year *Infant Welfare Clinics* are held at the Maternity Centre 536 infants were registered and 12,534 subsequent attendances recorded. The *Health Visitors* attached to this Centre made 10,189 visits to 787 newly born-babies.

It is to be noted that Infant Welfare and other Clinics were inaugurated at every Medical Officer's station throughout the year This movement was very popular with the Paramount Chiefs and the results most gratifying Dr W ALLAN describes in some detail an account of the 1936 *Health and Baby Meeting* which was held from March 1st to 7th.

At the various *Mission Hospitals* also Maternity and Child Welfare Work has been successfully carried out. The authorities of the Princess Christian Mission Hospital opened a new clinic at Yongro where good progress is being made

*School Hygiene*—Routine inspections continue to be impossible owing to shortage of necessary staff (see this *Bulletin* 1937 Supp p 30\*) but visits have been made as occasion demanded. Some improvement in the sanitary condition of the schools is reported. The elementary principles of hygiene continue to be taught in Colony and Protectorate Schools

*Public Health Sanitation etc*—Intensive vigour characterized the routine measures to combat insect borne diseases both in the Colony and the Protectorate with very satisfactory results. A detailed report of the work carried out in the Freetown area is included in the Annual Report under review

With regard to *sewage disposal* it is said conditions remain the same as in 1935 (see this *Bulletin* 1935 Supp p 23\* and 1936 Supp p 26\*)

The introduction of a water-borne sewage system in Freetown is under consideration. In the Protectorate where pit-latrines are universal good progress was made with the digging of latrines in the smaller villages which previously had no sanitation. In Freetown *Refuse disposal* schemes continue to function satisfactorily and in the Protectorate the bush-type incinerators are becoming increasingly popular (see this *Bulletin* 1937 Supp. p. 30\*).

In Freetown *water supplies* were restricted during the dry season. The question of augmenting existing sources with a view to preventing the recurrent shortage each dry season continues to receive careful attention and there is reason to hope that these inconveniences will shortly be disposed of. During the year 16 new public standposts were erected and 18 new private services laid on. Supplies in the Protectorate remain as described in these pages a year ago. Steps are being taken with a view to providing pipe-borne supplies to certain towns.

Owing to increased activity in the mining areas more and more *labourers* tend to be employed. Mining camps are inspected by Sanitary Officers. The steady increase in the numbers of labourers employed has greatly increased the work of sanitary supervision etc. of areas and made it difficult at times to maintain the necessary force of sanitary labourers.

*Housing and Town Planning* conditions remain much as described in the 1935 Report (see this *Bulletin* 1937 Supp. p. 30 ).

As regards *foodstuffs etc.* markets continue to be inspected daily and weekly reports as to their condition are rendered. Other premises are inspected regularly and nuisances reported and abated. Foodstuffs exposed for sale and found unfit for human consumption are seized and destroyed (see also this *Bulletin* 1937 Supp. p. 30\*).

The *Health Weeks* have proved so markedly successful that they are to be made annual events.

In the absence of new recruits the *training of Sanitary Personnel* was confined to refresher courses for existing sanitary inspectors. The practice of bringing these men to headquarters from their outstations for further instruction has greatly contributed to their increased efficiency.

*Port Health Work*—Though cases of yellow fever plague and smallpox, were reported from neighbouring colonies, Freetown was not in quarantine at any time during the year. Ships entering the Port numbered 825. Deck passengers disembarking numbered 1,731 and embarking 1,204 with Kruo boys disembarking 18,963 and embarking 16,753. Of these 576 deck passengers and 2,262 Kruo boys were vaccinated, while 837 of the former and 4,639 of the latter were passed through the Disinfecting Station.

*Hospitals Dispensaries etc.*—An increase in the numbers both of in- and out patients treated at the various Hospitals is reported, the greatest increase occurring in the Protectorate. It is believed the increases are not evidence of a greater amount of sickness, but rather reflect the growing readiness of the people to seek treatment by European methods.

At the European Hospital improvements carried out provide increased accommodation. A new hospital is to be erected and should be completed early in 1938. One new Protectorate type hospital was

erected at Port Loko during 1936. The five *Mission Hospitals* subsidized by Government continue to carry out excellent work and report increases in the numbers of patients treated. Two new Dispensaries were opened in the Protectorate. There are now 8 such treatment centres in the Colony and 14 in the Protectorate. The record of bed accommodation available and work accomplished during 1936 at Government and Mission Hospitals reads as follows —

Hospital	Beds	In-patients	Deaths	Out-patients
1 European	14	187	2	474
10 African	334	5,594	3-5	110,527
1 Mission	98	21,845(?)	?	1,281(?)

[It will be noted that in patients at Mission Hospitals appear to have been twenty times more numerous. The facts are reproduced as they are given on p. 45 of the Report under review. Probably the figures should be reversed.] The principal diseases and numbers treated at various institutions during the year included *acute and chronic bronchitis* 12,884, *acute and chronic rheumatism* 10,808, *hernia* 9,701, *yaws* 8,202, *malaria* 7,942, *wounds and injuries* 6,082. Textual commentaries relating to morbidity experience are briefly summarized hereafter by race and type of infection being —

	Benign Tertian	Quartan	Sub-tertian	Cachexia	Unclassified	Deaths
Europeans	8	7	65	—	47	—
Africans	61	199	749	253	6,550	4
Totals	59	206	811	253	6,597	4

There were also 2 non fatal cases of *blackwater fever* among Europeans, and 8 among Africans with 4 deaths.

During the year arrangements were made for the purchase of quinine at all Post Offices throughout the Colony and Protectorate. The drug was also distributed by Political Officers on tour in remote parts of the country. These arrangements which have been much appreciated bring quinine within the easy reach of everybody. At the Laboratory where 3,461 blood films were examined, 1,308 were positive for malaria parasites and the findings 836 *subtertian*, 236 *quartan*, 3 *benign tertian*, 133 mixed infections the latter including 131 *subtertian* and quartan infections.

One non fatal case of *yellow fever* was reported in an African soldier of the Sierra Leone Battalion R.W.A.F.F. stationed at Daru 21-4 miles from Freetown. The patient had been on leave at Bauama a village 45 miles distant. All precautions were taken and an intensive inspection of surrounding villages undertaken. blood specimens taken in Bauama proved negative but at two other villages positive reactions.



were 42.8 and 55.5 per cent, respectively. The blood specimens were taken from children under 10 years of age and the results of protection tests suggest that an epidemic has occurred in the district in recent years.

No case of *cerebrospinal meningitis relapsing fever plague* or *human rabies* was reported. Rat-catching continued, 6,892 were caught and 4,644 dissected all being negative for *P. pestis*. The dog catching gang captured 1,849 stray dogs and these were destroyed. The majority of the 99 persons who received anti-rabic treatment were dog-catchers. The brains of 13 dogs and 7 cats were examined, 13 (12 dogs 1 cat) proving positive for *negri* bodies.

The outbreak of *smallpox* which began in 1932 is gradually burning itself out as the result of vaccination. During the year a single undetected case in the Protectorate gave rise to 12 cases introduced into Freetown—a small localized outbreak resulted which was easily controlled. The distribution of cases and deaths was —

Area	Cases	Deaths	Vaccinations
Colony	59	9	13,063
Protectorate —			
Northern Province	107	13	5,573
Southern Province	225	29	11,233
Totals	391	51	29,869 (given as 20,083 in the Report)

Of the Colony cases 29 occurred in Freetown—the type was virulent and 8 deaths occurred—of the total Colony vaccinations 8,448 were carried out in Freetown.

Three non-fatal cases of *tropical typhus* were definitely diagnosed by the Weil-Felix reaction, all were of the OX 19 type. One of the cases occurred in a European engaged in the investigation of the disease and was almost certainly a Laboratory infection. Professor R. M. GORDON of the Sir Alfred Jones Research Laboratory who directs the pathological work of the Colony and is Consulting Pathologist to the Sierra Leone Government says of the disease. It is not yet possible to state how widespread is its range in Sierra Leone but it seems probable that further investigation will establish its presence in the Protectorate as well as in the Colony. The experiments at present being carried on in the Liverpool School of Tropical Medicine Laboratory in Freetown suggest that two types of the disease are occurring among the human population and that the so-called X 19 type is endemic amongst the rat population.

Nineteen cases of *enteric fever* with 5 deaths were reported. Of the total 18 occurred in Freetown (one an imported case) with 2 deaths. All the cases were sporadic and no common source of infection could definitely be traced. Exposed and unprotected foodstuffs are potential sources of infection while the numerous cesspits may have some bearing upon incidence. At the Laboratory where Widal tests were applied to 107 specimens of blood serum for the specific agglutinin of the enterica group 13 reacted positively with *Bact. typhosum* and the same

organism was isolated by bacteriological methods from blood or faeces in 4 other cases.

A further increase in the incidence of *dysentery* is recorded with 575 cases and 7 deaths eleven were non fatal cases among Europeans. Among all cases recorded types of infection were *amoebic* 264 *bacillary* 10 unclassified 301. Among 1 535 faecal specimens examined at the laboratory 17 contained *E. histolytica* cysts, in 44 the entamoebae were found free in 36 cases *E. coli* cysts were found and *E. coli* free in nine.

No cases of *tuberculosis* were reported among Europeans but there were 274 African cases with 26 deaths 231 cases and 20 deaths were due to the *pulmonary* form of the disease. Case incidence figures must be accepted with considerable reserve (see this *Bulletin* 1937 Supp p 33\*) Cases of *pneumonia* among Africans totalled 271 with 29 deaths and of *bronchitis* and *broncho-pneumonia* 12,989 cases and 10 deaths.

Cases of *avitaminosis* numbered 969 as compared with 1,311 in the preceding year the decrease is attributed to increased prosperity of the people and better standards of living. As a result of the investigations of Drs. A. CLARK and E. J. WRIGHT into the cyanogenic properties of the various species of yams steps were taken to instruct the public in the preparation of the tuber for human consumption. Ten cases of *beriberi* occurred with two deaths in the Protectorate. Three cases of *cancer* among whites were reported with one death the fatal case being that of an American sailor landed at Freetown in *extremis* death occurring shortly after admission to hospital. Among Africans there were 42 cases and 6 deaths. *Rheumatism* is a serious cause of disablement among Africans 10,808 cases received treatment and only 14 of these were Europeans.

*Helminthic infestations* are widespread throughout Sierra Leone. Records show 6,581 cases of *ascariasis* 404 of *ankylostomiasis* 234 of *taeniasis* and 98 of *schistosomiasis* only 3 European cases are recorded. Among the 1,535 faecal specimens examined at the laboratory 335 contained ancylostome ova, 229 ascaris 127 trichuris and 2 *S. mansoni*.

As regards *venereal diseases* a slight increase is noted in the numbers of cases of both *syphilis* and *gonorrhoea* of the former 769 and of the latter 2 758. Dr A. J. JOHNSON Medical Officer in charge of the V D Clinic, Freetown, contributes a tabulated statement of cases dealt with during the year. New cases numbered 579 and subsequent cases 11,321 gonorrhoea accounting for nearly 60 per cent. of all cases. Increased facilities for the treatment of yaws were probably responsible for an increase in the numbers treated, 8,202 as compared with 6 539 in the preceding year.

*Other diseases* mentioned in the Report include *trypanosomiasis* of which 3 non-fatal cases were reported from the Protectorate. New cases of leprosy numbered 195.

Extracts from some of the *Special Reports* contained in the Annual Report under review have already been mentioned under such headings as *Maternity and Child Welfare* *Baby Week* *Venereal Diseases* etc. and it remains to refer briefly to other contributions of a special nature. In the Report of the *Surgical Specialist* (Dr Q STEWART) details of the operative work carried out during the year are tabulated and seven surgical cases of unusual interest are described. Dr E S WALLS deals with the work of the *Eye Clinic* which re-opened on May

most important problem with which Bathurst has to deal the numerous earth drains which are responsible for considerable recurrent expenditure for upkeep repairs, etc. should be replaced by properly constructed concrete drains.

Methods of *sewage disposal* remain for all practical purposes unchanged, but alternative methods are receiving consideration experiments with septic tank latrines are in progress, and a number of public latrines were constructed during the year. In the Protectorate most of the pit latrines collapsed during the rains and bush septic tank latrines were sent to the large outstations. The system of *refuse disposal* (see this Bulletin 1937 Supp. p. 36\*) functions for the most part satisfactorily.

With regard to *water supplies* the old water mains are gradually being replaced throughout Bathurst and a chlorination plant has been installed at the waterworks. The position regarding *housing* in Bathurst is unchanged (see this Bulletin 1937 Supp. p. 36\*). The Report observes "Nearer and nearer to us each year creeps plague. We are in no position to withstand it and shall not be until the miserable hovels so prevalent here are razed to the ground and proper rat proof buildings erected in their stead.

A special section of the Report deals with various aspects of medical work in the Protectorate. Sanitary Inspectors with labour gangs have been stationed at the more important centres, the Public Health Ordinance applied to these places, and attention was devoted to the construction of latrines incinerators, etc. travelling vaccinators visited the areas at intervals and market sites improved.

*Port Health Work*—During the year 259 ships were boarded deck passengers were inspected and kept under surveillance when necessary. All the 101 aeroplanes landing had clean Bills of Health. Quarantine regulations were applied to Senegal and Dakar on account of plague to Senegal for yellow fever and the Upper River Province was declared an infected area during the year under review.

*Hospitals Dispensaries etc*—During 1936 medical facilities were considerably augmented in the Protectorate. In addition to the Welfare Centre established at Sokuta (see above) a bush hospital and dispensary were established at Kaiak about 60 miles further inland, and a Leper Camp constructed by a progressive Chief at Buruko in MacCarthy Island Province. All these ventures which met with immediate success were made possible by the sympathetic attitude of Government the willing co-operation of Administrative Officers and the financial assistance of the Provincial Emergency and Development Fund. The record of work at the principal centres of treatment reads as shown in the table in p. 47.

The following notes briefly summarize the principal references to morbidity experience contained in the Report under review.

*Malaria*—At the Bathurst Hospital where 726 patients received treatment, 615 were out-patients. Two hospital deaths were recorded. Types of infection were distributed as to 33 *benign tertian* 4 *quartan* 514 *subtertian* (of which 425 were out-patients) 1 *malarial cachexia* and 174 were unclassified. At the Georgetown and Bwiam Hospitals (data grouped) 743 patients were treated and only 9 were in-patients. *Subtertian* infections predominated with 530 there were 3 cases of

benign tertian one each of *quarlan* and *cachexia* and 207 were unclassified. No case of *blackwater fever* was recorded.

It is stated that there is a noticeable decrease in the numbers of mosquitoes seen in Bathurst this is largely attributed to the extensive tree-cutting and other control measures which have been so energetically carried out

Treatment Centre	In-patients			Out patients Treated
	Admitted	Total Treated	Deaths	
Victoria Hospital Bathurst	1 313	1,350	134	18 701
Prison Hospital Bathurst	—	31	—	148
Georgetown Hospital	425	449	61	7 134
Bwiam Hospital	—	94	23	over 7 000
Basse Dispensary	—	—	—	4 185
Kau-ar Dispensary	—	—	—	5 010
Kalaif Dispensary	—	—	—	" over 3 000
Kerewan Voluntary Dispensary	—	—	—	3 022

No case of *yellow fever* was recorded during the year. All Europeans are now inoculated against the disease. The inspectorate staff was maintained and weekly inspections of compounds etc. carried out (see this *Bulletin* 1937 Supp p 36\*). The larval index for Bathurst for the year was 0.15 this figure is in marked contrast to figures for outstations in the Protectorate (where they range from 0.23 to 5.68) and testify to the value of regular house-to-house inspections. No case of *plague* was reported though the disease exists in countries surrounding Gambia. During the year 9,343 rats were caught and periodic *smears* taken but all gave negative results for *P. pestis*. *Trypanosomiasis* is said to be on the increase travellers report a marked increase in the numbers of tsetse fly seen in some up-river areas. In the Protectorate a hyperendemic area of the disease extends from MacCarthy Island to Kau ur on the North bank it reaches to the French border extending on the South into Western Jarra Foni and the Kombo districts on the coast. The infected area corresponds roughly with the rice growing country and the problem of control is an unusually difficult one. It is stated that a large number of patients who appear to have none of the symptoms clinically typical of sleeping sickness are found to have enlarged cervical glands and give positive gland punctures these chronic low-grade cases constitute a serious danger.

Altogether 1 972 cases of the disease were recorded. 1 000 of the 1,274 cases treated in the Protectorate were dealt with at the new centres established at Bwiam and Kalaif (see above). At Bwiam also experimental tsetse fly traps were tried out but met with little success. The demonstration at Bullock by the Agricultural Superintendent (see this *Bulletin* 1937 Supp p 37\*) who showed how a typical tsetse valley could easily be converted and easily controlled was not followed up by the inhabitants. As regards hospital records at Bathurst 36 in-patients were treated with 7 deaths and there were 453 out patients. At the Georgetown

and Bwiam Hospitals there were 221 in-patients, 1 188 out-patients and 27 deaths were recorded.

A serious outbreak of *smallpox* occurred in the Upper River Province in June and July and 140 cases with 24 deaths were recorded. It is stated that many cases were concealed, despite the fact that serious measures were applied to persons guilty of concealment of cases or of withholding information. In these circumstances the actual number of cases or deaths is unknown. Prompt measures were taken to deal with the outbreak: contacts were isolated, many compounds burned and an extensive vaccination campaign instituted. Vaccinations in Bathurst numbered 1 904 and in the Protectorate 18 564 of the latter 13 241 were performed in the Upper River Province. Within a month the situation was under control and no further cases were reported.

Five non fatal cases of *enteric fever* comprised 3 in-patients and 2 out patients treated at the Victoria Hospital, Bathurst. *Dysentery* gave rise to 196 cases distributed as to 129 amoebic, 62 bacillary and 5 unclassified. Eleven deaths were due to this cause. At the Bathurst Hospital 48 in patients and 103 out patients were dealt with and at the Georgetown and Bwiam Hospitals in-patients treated for this disease numbered 14 and out patients 31. Until better arrangements can be made for the disposal of excreta in the Protectorate enteric fever and dysentery (and helminthic diseases) will continue to be responsible for much sickness and mortality especially among infants and children.

According to hospital returns there were 160 cases of *tuberculosis* (all forms) with 11 deaths. 144 of the cases and all the deaths were ascribed to the *pulmonary* form of the disease. The figures are no indication of actual prevalence. It is stated that until housing conditions are greatly improved, incidence will continue to remain high. Hospital returns also record 4 677 cases of *bronchitis* and *broncho-pneumonia* with 14 deaths and 175 cases of *pneumonia* with 25 deaths. It is also stated that many patients in the Protectorate presenting pneumonic symptoms which are not substantiated by physical signs on examination are believed to represent the acute stage of other diseases. Six such cases were suspected of being *tropical typhus* but though these were not confirmed serologically a 50 per cent mortality indicates the seriousness of the condition and the urgent need of pathological investigations to be undertaken. Steps are being taken to meet this need.

Of *helminthic diseases* the Report observes: the figures give no indication of the prevalence of these diseases—especially is this the case with regard to *ankylostomiasis* the incidence of which must run into tens of thousands. Hospital returns show 1 040 cases of *ascariasis* only 136 of *ankylostomiasis* 90 *loasiasis* 4 *draconiasis* 47 of *schistosomiasis* and other helminths 8. The Report states that "the incidence of these diseases must be considerably higher in the Protectorate" and in this connexion it is not without interest to note that only 11 cases of *ankylostomiasis* and 274 of *ascariasis* were recorded in Protectorate hospitals.

In the text of the Report reference is made to 434 cases of *leprosy* hospital returns record only 358 cases 284 of these being treated in hospitals in the Protectorate. Reference has already been made to the new leper camp at Buruko (see Hospitals above). This centre which takes in cases from the Upper River and MacCarthy Island

Provinces dealt with 108 patients during the year it is stated that where continued treatment with Alepol is available many patients show definite improvement. The need for another Leper Camp for North and South Bank Provinces is to be met by the establishment of a centre near Bwiam.

*Veneral Diseases* are unmentioned in the text of the Report but Hospital Returns show 197 cases of *syphilis* and 642 of *gonococcal infections*. *Yaws* was responsible for 4 046 cases. The disease is said to be definitely increasing while incidence increases with distance from the coast only 154 cases were dealt with in Bathurst but in the Georgetown Hospital there were no less than 1,948 over a quarter of the total patients treated for all causes of sickness (see also this *Bulletin* 1937 Supp. p. 37\*)

*Other diseases* mentioned include *whooping cough* 283 cases (275 in Bathurst alone) *influenza* 87 cases *tetanus* 35 and *measles* only 2 cases. Although only 35 cases of *tetanus* are recorded—with 13 deaths—it may be noted that total deaths due to this cause in the Colony and Protectorate numbered 46 and 34 of these were ascribed to *tetanus neonatorum*. Rules for midwives have been introduced with a view to reducing the number of cases of this easily preventable disease.

*Scientific*—Dr MURGATROYD of the Liverpool School of Tropical Medicine was engaged in chemotherapy studies in relation to trypanosomiasis. The Victoria Hospital Laboratory Report briefly records the numbers of specimens of various kinds examined during the year but results of these examinations are not supplied.

*Financial*—Actual expenditure on Medical and Health Services during 1936 amounted to £30,895 as compared with an estimated expenditure of £32,336. Medical Department expenditure accounted for 11.9 per cent. of the total expenditure of the Colony.

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## EAST AFRICA

## KENYA COLONY AND PROTECTORATE (1936)

**Kenya Colony and Protectorate** is in Eastern Equatorial Africa. It is bounded on the north by Abyssinia and the Sudan, on the west by Uganda, on the south by Tanganyika Territory and on the east by the Indian Ocean and Italian Somaliland. The total area is 224,960 sq. miles and is divided into nine provinces: Nyanza, Nzoia, Turkana, Rift Valley, Mamas, Kikuyu, Ukamba, the Coast, and the Northern Frontier Provinces. Its capital is Nairobi and Mombasa the principal port.

**Vital Statistics**—The position regarding vital registration remains unchanged (see this *Bulletin* 1937 Supp. p. 39\*) it is noted that the question of the institution of a satisfactory system of registration of births and deaths has been under review by Government during the year and the matter has also received attention from at least one Local Native Council. Dr A. R. PATERSON comments upon the difficulties attending public health administration etc. in the absence of carefully recorded facts and quotes at some length from the Introductory Note prefacing the 1936 issue of this Supplement.

For Africans the estimated population in 1936 is given as 3,186,976 for Europeans and Whites 18,192, Indians 38,653, Arabs and others 14,458 and Goans 3,577 making the total population in the Colony and Protectorate 3,261,856.

Registration is still so incomplete as to be practically worthless; available records for 1936 show —

	Registered Births	Registered Deaths	Infant deaths
Europeans and Whites	295	144	Unmentioned
Africans and Others	48	1,500	"
Indians	435	448	"
Goans	107	19	"

**European Officials** resident numbered 1,798 with an average number resident of 1,412. During the year 9 were invalided and 8 died. **Non-European Officials** resident totalled 2,491 and the average number resident 2,126. Among these 12 were invalided and 3 died.

**Maternity and Child Welfare Work** is carried out by four main agencies viz: (a) The Government Medical Department, (b) The Missionary Societies, (c) The Lady Grigg Welfare League, and (d) The Municipal Council of Nairobi, the three latter organizations receiving financial assistance from Government for the work carried out. Maternity work at various centres included the following —

	Maternity Cases	Midwives in Training	Midwives Qualified
Government and Local Native Council Hospitals, 18 Centres	1,278	18	8
Lady Grigg Welfare League, 3 Centres	758	4	1
Mission Hospitals, 8 Centres	1,009	7	7

At Government Ante Natal and Child Welfare Centres in Mombasa attendances totalled 33,203 and home visits by the staff 16,317 at the Eldoret Centre attendances were 3,669 and home visits 4,410. In Nairobi this work has been the responsibility of the Municipality since 1935 during the year under review attendances numbered 37,548 and home visits 12,532.

Special note is made of the successful work accomplished in rural areas in recent years and this is attributed to the fact that by the provision of female staff at hospital centres the confidence of African women and their husbands was obtained. Since 1928 special maternity wards at five hospitals have been erected by Local Native Councils.

*School Hygiene*—There is still no School Medical Service. In most native areas a considerable amount of work is said to be carried out by District Medical Officers and Sanitary Inspectors. At Eldoret Indian and African schools were visited weekly. No details of these visits are supplied.

*Public Health Sanitation etc.* Dr A. R. PATERSON reports that the maintenance and administration of the many health services in the Colony and Protectorate was even more difficult during 1936 than in the preceding year. Demands for relief increased greatly, opportunities for constructive work were more numerous yet financial provision to meet these was no greater and the sanctioned strength of Medical Officers was 48 as against 50 in 1935. On the other hand it is gratifying to note that the report of practically every District Medical Officer refers to the increasing interest taken by Local Native Councils and by the people at large in public health matters. Dr PATERSON contributes a brief historical survey of the development of public health work in Kenya from 1921 to the present time and among other expressions of opinion emphasizes the importance of having prescribed facts regularly recorded if the progress of public health work is to be assessed with some degree of accuracy. Such facts as are available suggest there is reason to believe that on the whole the health of the people may have been better during the year under review than in 1935. No unusually high incidence of any of the more dangerous infectious diseases nor of bowel or respiratory affections was recorded.

With regard to general measures of sanitation it is stated that the pit-latrines campaign continued to feature the general sanitary programme of the Department where staffs were available towards the end of the year the disposal of night soil and refuse by the Indore Composting method was tried out with success in one of the smaller townships. Antimalarial control measures were maintained as usual in the Kusumu area special works were undertaken with the financial assistance of a grant from the Colonial Development Fund. A considerable housing and town planning scheme for the improvement of one of the slum areas of Nairobi was prepared and a large amount of propaganda work carried out in the native reserves. The routine inspection of food markets dairies etc. continued as usual. In the native reserves food supplies were better with increase in the consumption of meat. Over the country as a whole however dietaries are still far from satisfactory among the agricultural tribes the use of milk is not yet appreciated and the supply of green foods inadequate and irregular. Labour conditions on the goldfields were on the whole



satisfactory though employers of labour are not yet prepared to embark on housing schemes involving large capital expenditure.

Medical Officers and Sanitary Inspectors devoted attention to the instruction of people in the native reserves in the elementary principles of hygiene. Health exhibits were staged at the Agricultural and Trade Shows at Nairobi and Mombasa, and similar exhibits were organized by individual Missions (and on one occasion by an African headman) in a number of native reserves.

For financial and other reasons the *training of Africans as dispensary health workers* was discontinued during the year.

*Recommendations for future work*—The Report refers to the earlier recommendations with regard to research into the reactions to disease etc. of the African (see this *Bulletin* 1937 Supp. p. 40\*). The importance of improving the nutritional standards of the people through the education of males in agriculture and animal husbandry and the females in housekeeping is emphasized. The attention of local authorities is also directed towards the importance of improving housing conditions.

*Port Health Work*—Steamships entering at Kilindini or Mombasa during the year numbered 701 and dhows 1 489. A vessel from India arrived with a case diagnosed as smallpox; no infected dhows were recorded. The usual sanitary etc. control services in the port area continued to function satisfactorily. 4,833 rats were trapped and 634 dissected but all with negative results for *P. pestis*. The Port Health Officer has had placed at his disposal a small room where seamen can be treated for venereal diseases. Having regard to the amount of shipping activity a properly equipped clinic is desirable.

Although there are three "authorised" aerodromes in Kenya there is no aerodrome designated as a "Sanitary Aerodrome" since *permanent* and adequate facilities at existing airports for the isolation of contacts etc. are lacking though temporary arrangements could easily be improved. Otherwise all the "authorised" aerodromes comply in all essentials with the requirements of the Convention. So far as aerial traffic is concerned, Kenya stands in an important position. Up to the present yellow fever has never occurred in the territory but on the eastern seaboard the climate is hot and moist and the incidence of *A. des. aegypti* is high. But the northern western and central areas of the territory are natural barriers between the eastern seaboard and the infected or suspected areas lying to the north and west of the Colony and in view of these conditions a regulation requires all aircraft arriving from west of Long 32.5 East must make their first landings at either Kisumu or Nairobi where the *Aedes* index is low. On arrival at these aerodromes aircraft are disinfected.

*Hospitals, Dispensaries, etc.*—Of the work in general the Report observes: "Our hospitals remain full to overflowing with cases of acute disease; our dispensaries crowded with patients of whom far larger numbers than can be accommodated are clearly in need of hospital rather than dispensary treatment. Patients treated at the various institutions during the year were: *In-patients* European 1,817 Asiatic and African 48,632. *Out-patients* European 3,609 Asiatic and African 408,783. At *Out-dispensaries* in Native Reserves 640,281 first attendances were recorded."

*Mission Hospitals* in receipt of grants-in-aid from Government dealt with 8,536 in patients 137,802 out patients and 80 951 dispensary patients

The *training of Africans* as hospital assistants or male general nurses was carried on as usual at the Native Hospital Nairobi. Twelve finished their training during the year and 21 learners were enrolled. Two of the three compounders who sat for the final examination were successful three new entrants commenced training. It is hoped that at the proposed new native hospital at Nairobi facilities may be provided for the systematic training of African women in general nursing.

The notes which follow summarize the principal items of morbidity experience commented upon in the Report under review.

*Malaria* in Kenya is endemic in all the warmer and low-lying areas and little change appears to occur from year to year. During the year 32,882 cases were treated in hospitals or at dispensaries other than out-dispensaries and of these 15 108 were defined as clinical cases in 7 009 the type of infection was not defined. Of the remainder 707 were *benign tertian* infections 778 *quartan* 8 789 *subtertian* and 480 malarial cachexia. At the Medical Research Laboratory where 14 025 blood films were examined 1 680 were positive with *P. falciparum* 182 *P. vivax* 83 *P. malariae*. At the Mombasa Clinical Laboratory among 5 446 blood specimens 4 063 gave negative results among the positives were *P. falciparum* 1 020 *P. malariae* 53 *P. vivax* 19.

Twenty-four cases of *blackwater fever* were recorded with 5 deaths. Malaria control measures have been the subject of brief mention in the section entitled *Public Health*. In Nairobi routine observations were continued and the Medical Officer of Health kept informed of breeding activity. At Mombasa where an extensive entomological survey is in progress *A. finestus* has not so far been found on the Island and only scanty findings of *A. gambiae*. In other areas general control work and mosquito surveys were continued.

So far as is known *yellow fever* has never occurred in Kenya, but in view of the possible introduction of the infection through the medium of aerial traffic *Aedes* surveys have been made in towns along the air route. The *Aedes* index in Kisumu was found to be *nil* Nairobi 0.19 per cent. but Mombasa is seriously infested. Effective control measures are to be introduced (see also *Port Health Work* above). Except for one imported case *smallpox* was absent. 15,859 vaccinations were performed during the year. At the Medical Research Laboratory 1 657 447 doses of calf lymph were prepared and 1,552 739 doses issued. the Laboratory Report supplies Tables showing the history of each strain.

A sharp outbreak of *plague* gave rise to 139 recorded cases the Central Province being principally affected. It is said the true incidence of the disease was much higher than the verified cases would appear to suggest. In a number of districts steps were taken to clear and cleanse villages and improve village grain-stores with the result that more pasturage has become available and less cover for rats. These efforts continue.

*Cerebrospinal meningitis* though present in most districts throughout the year and the cause of considerable anxiety never assumed epidemic proportions. 319 cases were treated 296 of these as hospital in patients.

with 162 deaths. Nine non-fatal cases of typhus were recorded, all among Europeans and 8 non-fatal cases of diphtheria.

Of enteric fever the Report observes 185 cases were treated but Hospital Returns show 209 cases with 42 deaths, the distribution of types of infection among the cases being typhoid 174 paratyphoid A 5 paratyphoid B 7 and undefined 23. At the Medical Research Laboratory where 733 specimens of serum were tested for agglutinins of the enterica group 442 gave negative results 147 reacted positively with *Bact. typhosum* 2 with *Bact. paratyphosum A* and 15 with *Bact. paratyphosum B*. At the Mombasa Laboratory where 140 samples were tested, 102 were negative, positive findings being *Bact. typhosum* 27 *Bact. paratyphosum A* 3 *Bact. paratyphosum B* 5.

As regards dysentery in the text of the Report, 2,211 cases are recorded, distributed as to 1,225 amoebic, 89 bacillary and 897 undefined, but Hospital Returns show a total of 2,234 cases of which 1,240 were amoebic 91 bacillary and 903 undefined as to type of infection. At the Medical Research Laboratory where 12,948 faecal specimens were examined 5,135 were negative the protozoan *E. histolytica* was found in 618 cases and at the Mombasa Laboratory the same organism was identified in 249 out of 3,835 specimens examined (1,179 negative). No special preventive measures were carried out for the dysenteries or enteric fevers.

Nine cases of trypanosomiasis were reported. The experiment of clearing riverine and lacustrine areas in South and Central Kavirondo was continued (see this *Bulletin* 1937 Supp. p. 43\*). The Medical Entomologist reports the elimination of *G. palpalis* along certain rivers and the opening up of large acreages for cotton production as a result of this work. Trapping and hand catching of tsetse continue in the Port Victoria area.

According to Hospital Returns 1,500 patients were treated for tuberculosis though only 1,201 are mentioned in the text of the Report of the total hospital cases in- and out patients 856 suffered from the pulmonary form of the disease. No *ad hoc* preventive measures were carried out. At the Medical Research Laboratory 134 specimens of sputum were positive with *M. tuberculosis* among 1,200 specimens examined the bacillus was also found in two urines and one stool and in two out of 183 samples of cerebrospinal fluids. At the Mombasa Laboratory *M. tuberculosis* was identified in 133 out of 474 specimens of sputum examined. Patients treated for pneumonia in Government Hospitals numbered 3,728 and 635 hospital deaths were ascribed to this cause. The Medical Research Laboratory Report contains an account of the research work on pneumococci carried out during the past six years over this period nearly 800 strains were typed and a vaccine containing the eight most prevalent types was produced. The value of this vaccine is being tried out on cases of pneumonia in H.M. Prison Nairobi (see also this *Bulletin*, 1936 Supp. p. 40\* and 1937 Supp. p. 43\*).

For helminthic diseases 51,029 persons received treatment these comprised 40,496 cases of taeniasis 9,318 ascariasis 1,392 ankylostomiasis and 823 of schistosomiasis. Among the 7,813 faecal specimens giving positive findings at the Medical Research Laboratory 1,774 contained ova of taenia 1,348 ancylostomes 682 ascaris and 258 *S. mansoni*. At the Mombasa Laboratory among 2,066 positive

findings results were of different order with ova of *ancylostome* 1,383  
*trichuris* 1,241 *ascaris* 879 *taenia* 488 and *S. mansoni* 91  
 Five hundred and twenty-eight cases of leprosy received treatment during the year

Special clinics for the treatment of venereal diseases are held weekly for men at three centres in Nairobi and one in Mombasa for women at five centres in Mombasa and one in Nairobi. Treatment is also given at all hospitals and dispensaries. The chief difficulty at all centres is to persuade patients to continue treatment after their more distressing symptoms have been relieved. Hospital Returns show that 8,448 cases of syphilis were treated 3,883 of gonococcal infections soft chancre 133 and granuloma venereum 3. Medical Officers of certain districts report with concern an apparently general increase in the incidence of gonorrhoea (see also this Bulletin 1937 Supp p 43\*). Persons treated for syphilis numbered 12,258. At the Medical Research Laboratory where the Kahn reaction is used as a routine test for syphilis 3,625 sera were received 1,388 gave positive and 240 doubtful reactions.

Scientific—Dr F W VINT Senior Pathologist contributes a comprehensive Report describing the activities of the Medical Research Laboratory. During the year 28,343 specimens of various kinds were received and dealt with the principal findings in many cases have already been mentioned under such headings as malaria yellow fever enteric fever smallpox pneumonia etc. in these notes. Among other Research work mentioned in the Laboratory Report reference is made to the studies of basal metabolism and energy exchange in Kenyan natives which were commenced during the year and also investigations on the subject of nutrition.

Scientific papers published by the Staff of the Section of Medical Entomology include—

SVENSSON (C B) *A. funestus* (Giles) as a Domestic Breeder—*Insects Trop Med & Parasit* 1936 Oct. 2 Vol. 30 No 3

— & McILHON (J P) The Food of Tsetse Flies (*G. swynnertonii* and *G. palpalis*) as determined by the Precipitin Test.—*Bull Ent Res* 1937 Mar

— & VANE (R. T) The Eradication of *G. palpalis* from River Areas by the Block Method.—*Rec Med Res Lab* No 7

ROBERTS (J I)—Plague Conditions in Urban Areas in Kenya.—*Jour Hyg* 1936 Sept Vol. 36 No 1

— Plague Conditions in Rural Areas in Kenya.—*Jour Hyg* 1936 Sept. Vol. 36 No 1

— The Carriage of Plague.—*Jour Hyg* 1936 Sept. Vol. 36 No 1

— & TONKING (H. D) Notes on an East African Vesicant Beetle *Paederus Crebripunctatus* Epp.—*Ann Trop Med and Parasit* 1935 Vol. 29 No 4

A résumé of the year's work carried out at the Clinical Laboratory Mombasa is also contributed by Mr W L TRIMAN the Officer in charge. Here also the principal findings have been mentioned in the preceding notes making repetition unnecessary.

Financial—The sanctioned medical budget for 1936 amounted to £197,062 and actual expenditure £196,368 the latter approximating 5.9 per cent. of the total estimated expenditure for the Colony and Protectorate.

## UGANDA PROTECTORATE (1936)

The Uganda Protectorate lies in the northern part of the Great Lakes region of Africa. It has no sea coast, being bounded by the Anglo-Egyptian Sudan on the north, Kenya Colony on the east, Lake Victoria Nyanza and the Tanganyika Territory on the south, and the Belgian Colony on the west. The area of the Protectorate is estimated at 94 204 sq. miles, including 13 616 sq. miles of water. (The area of England without Wales is a little over 50 000 sq. miles.) The head quarters are at Entebbe and the chief commercial towns are Kampala and Jinja. All three are on or near the north shore of Lake Victoria.

*Vital Statistics*—The principal data are set out in the following Table—

Provinces	Estimated Popula- tion	Reg'd Births	Birth Rate	Reg'd Deaths	Death Rate	Infant Deaths	I M R
Buganda	884 173	20 483	23.2	16,600	18.8	1,818	83.8
Eastern	1 185,368	31,510	26.6	29 689	25.1	6,293	199.9
Western	754 192	20,233	27.6	11 191	18.2	2,451	121.1
Northern	799 480	22 968	28.7	13 123	16.4	4,535	197.5
Protectorate Totals ..	3 603,218	95 194	26.4	70 603	19.6	15 10*	158.6

If the registration figures are to be trusted the population of the Western and Northern Provinces is increasing more rapidly than the other Provinces.

*European Officials* resident numbered 570 with an average number resident of 462. One was invalided but no deaths were recorded. *Malaria* was the most common cause of illness. Among *European Non-Officials* 2,330 cases of sickness were treated by Government Medical Officers malaria accounting for 452 cases and injuries for 142 deaths within this group numbered 21. *Asiatic Officials* resident numbered 367 average number resident 306 six were invalided and one died. *Malaria* was responsible for 340 cases of sickness. The Government Medical Staff treated 7 024 cases of illness among *Asiatic Non-Officials* malaria heading the list with 2,278 cases. 88 deaths were recorded, 26 being due to blackwater fever 12 to malaria and 17 to pneumonia.

*African Officials* (African Civil Service) resident numbered 178. There were no invalidings, but one death was recorded due to *pneumonic plague*.

*Maternity and Child Welfare Work*.—This work grows increasingly popular and the appointment of European Nursing Sisters to every district hospital in the Protectorate with the exception of four has made extensive developments possible. At the close of the year there were seven rural maternity centres under direct Government control in addition to the numerous dispensaries and clinics undertaking ante- and post-natal welfare work without providing beds for confinement. During the year under review 16,689 women made 68,477 attendances at established centres for ante-natal supervision, 1,859 confinements were conducted at hospitals and maternity centres, and 1 732 babies

were born. The maternal mortality rate for the Protectorate as a whole was 12·3 per 1 000 births the highest rate being recorded in the Northern Province with 17·4 per 1 000 births and the lowest in the Western Province where the rate was 8·1 per 1 000 births. It is pointed out that the maternal mortality rate is raised by pregnant women who seek hospital admission as a last resort when unskilled efforts outside have failed in these circumstances it is not surprising to read that so many of these women die. Midwives on the registers at the end of the year were European and Asiatics 69 Africans 220.

At the *Lady Coryndon Maternity Training School* 41 students were in training 17 sat for the certificate of the Uganda Midwives Board, and 15 were successful. 77 midwives six of these in training for general nursing were in service during the year. Admissions to the clinical wards of the School numbered 589 confinements 392 310 live births and 24 maternal deaths were recorded. The Outpatient Department dealt with 3 739 expectant mothers and 869 infants brought up for post-natal supervision. No new country centres were opened owing to lack of funds but at the 22 existing centres records of work include 1 431 confinements live births 1,380 infant deaths 56 maternal deaths 9 ante-natal cases 10,844 child welfare attendances 12 702 and total outpatient attendances 67 716.

The Report of the *Nsambya Maternity Training School* states that a new maternity hospital accommodating 22 patients was built during the year and improvements made to existing buildings in Nagongera and Ngora. At the Nsambya Centre 30 students were in training five sat for and were successful at the examination of the Midwives Board. Patients admitted to the clinical wards of the Nsambya School numbered 314 confinements 237 live babies born 201 and maternal deaths 8. The 17 country centres confinements totalled 1 693 live births 1 616 infant deaths 19 and maternal deaths 21 there were also recorded 4,838 new ante natal cases 1 651 infant deaths 56 maternal deaths 9 ante-natal cases 10,844 child welfare attendances 12 702 and total outpatient attendances 67 716.

*School Hygiene*—Frequent visits to schools continue to be made by Medical Officers and their assistants. A frequent anomaly reported was the complete absence of sanitary accommodation for pupils even though the teaching of hygiene figures prominently in the School curriculum. Owing to lack of funds improvement is slow but it is reported that in the secondary schools and larger primary schools latrines are now provided. Schools often fall short of the ordinary standards of ventilation and lighting dormitories are overcrowded and the rooms not maintained in the state of cleanliness desirable. The elementary sanitary requirements for schools embodied in the draft School Health Regulations as finally adopted by the Advisory Council on Native Education are printed as an Appendix to the Report under review. The medical inspection of school-children was carried out in a number of districts dental caries and trachoma being reported as particularly prevalent. Height and weight measurements of Buganda schoolboys were recorded by Dr A. G. MACKAY of Masaka. Milk is to be issued to the school-children in Mengo District under the supervision of the Medical Officer who will record the results of this dietary experiment.

*Public Health Sanitation etc*—The Report records a year's work resulting in slow and steady progress made. The powers provided by

The Public Health Ordinance 1935 enable the authorities to frame and enforce rules for health betterment the consolidation and simplification of various regulations formerly in force the new draft building drainage and other regulations in course of preparation are discussed at some length.

The water-borne *sewage scheme* for the commercial area of Kampala was commenced during the year and it is hoped the work will be completed by the end of 1937. The single bucket system continues to be employed in the larger townships and is gradually being extended to smaller centres of population. At schools factories etc. deep pit-latrines are the usual rule. With regard to *water supplies* the duplication of the pipe line for Kampala was commenced and Government has also approved the provision of piped supplies to Entebbe and Mbale. In rural areas sanitary inspectors continued to assist Native Authorities in the improvement and protection of local supplies.

Questions concerned with labour received special consideration. The New Rules under the Masters and Servants Ordinance were published for general information during the year only to be met with great opposition from employers of labour who objected to the clauses concerned with housing, diet and hours of work. The growth of insanitary housing conditions in trading centres and large towns complicates the problems of public health administration. The dangers of uncontrolled exploitation of land for building purposes are discussed, and steps taken to deal with these matters are described. The slum area in Jinja Township was cleared during 1936 all buildings being destroyed and the area burnt over. model dwellings in *pseudo-tents* will be erected. The standard of housing for the African is said to have improved considerably in recent years. in small townships the standard of the Asian bazaar is said still to be bad.

Legislation dealing with the control of food supplies and vendors of food is in course of preparation and regulations to ensure the production of reasonably clean milk at dairies are also projected. A combined agricultural and health survey of two areas was undertaken during 1936 and the results of the investigation published under the title "The Agricultural Survey Committee Nutrition Report No. 1—Teso".

*Propaganda etc.*—The most successful Welfare Exhibition yet held in Uganda organized by the Provincial Administration with the co-operation of the Medical, Agricultural Veterinary and Education Departments was held at Lira in the Lango District. It is believed the lessons resulting from this exhibition will give great impetus to ordered sanitary development and improved health and efficiency not only in the district but also in the Northern Province as a whole. The various exhibits, etc. are described in detail in the Report under review.

*Training of Sanitary Personnel.*—In January 1936 the Instructor of Hygiene made a commencement with the systematic training of Africans for employment as Health Orderlies or Sanitary Inspectors. The whole course will cover two years and eight months, and a high standard of knowledge and efficiency is aimed at. It is hoped to arrange for Africans thus trained to be examined by a Joint Examining Board for all East African Territories and the certificate of this Board to be recognized by the Royal Sanitary Institute. The training of

Nursing Orderlies Dispensaries etc. is discussed in the section Uganda Medical School below

*Hospitals Dispensaries etc.*—During the year a comprehensive list of requirements for existing and projected hospital and dispensaries covering the next five years was prepared and submitted for Government consideration. The principal establishment changes in 1936 included the increase of nursing sisters from 20 to 25 and of Asiatic nurses from 4 to 5. The post of Asiatic Surgeon was abolished the number of Sub-Assistant Surgeons reduced from 15 to 12 and the increase of Senior African Medical Assistants from 22 to 28.

At the end of the year there were 4 European 9 Asiatic and 23 African Hospitals and in addition 93 (an increase of six) Dispensaries and Dressing Posts. The record of work carried out at these centres is shown in the Table as follows—

Hospitals etc.	Beds	Patients Admitted	Total Treated	Hospital Deaths	Out-patients New Cases	Out-patient Attendances
4 European	34	517	—	—	442,573	1 070 103
9 Asiatic	56	1,345	—	—		
23 African	1,273	29,215	—	—		
93 Dispensaries, etc.	529	?	—	—		
Totals	1 892	31,077	32,165	1,833	643 897	2,024 721
					1 088 570	3 094 829

Summarizing the principal items of morbidity experience during 1936 we have the following—

*Malaria*—Since 1932 the numbers of cases and deaths ascribed to this cause have progressively increased. During 1936 total cases of malaria treated at various centres numbered 71 407 and of these 31 656 [in the Hospital Returns totals read 33 607] were treated in station hospitals and 39 751 in dispensaries. The increased incidence was general throughout the Protectorate though smallest in the Northern Province and highest in the Eastern Province. A great part of the increased incidence occurred among the large numbers of immigrant labourers who arrived in greatly debilitated condition, and, further the early months of 1936 were unusually wet with the result that there was an increase in the numbers of mosquito breeding places. Among the 33 607 in and out patients treated at station hospitals 20 166 were defined as clinical malaria. Of the remainder 1,269 were *benign tertian* 1 531 *quartan* 10,278 *subtertian* 307 mixed infections and 58 malarial cachexia. There were 142 hospital deaths due to malaria. At the Laboratory where 12,518 blood films were examined for parasites 585 contained *P. malariae* 2,941 *P. falciparum* 65 *P. vivax* 64 mixed infections and 440 malaria parasites species not identified.

Of *Nackrat* fever 63 cases with 14 deaths were reported by Government Medical Officers and 96 cases with 16 deaths by private practitioners a total of 159 cases and 30 deaths in the Protectorate. The distribution of cases and mortality reads European 8 cases 2 deaths Asians 141 cases 26 deaths Africans 10 cases 2 deaths. During the past four years there have only been 40 cases among



Europeans as against 539 among Asians. Among Africans appear the first recorded case in a female.

Malaria control work included drainage filling in wells and depredations, reclamation of potential anopheline breeding places and anti-malarial swamp planting. It is stated that Africans trained in searching for mosquito larvae and adults and capable of identifying the commoner species are now available in most towns and have assisted considerably in control measures.

*Yellow Fever*—Blood samples taken from people living in the Northern Province were sent for examination to the Rockefeller Foundation Laboratory New York the sera of four were found to show immunity to yellow fever and nine of these bloods also showed immune bodies to Rift Valley Fever. Five out of 22 samples of blood from forest monkeys in the same area showed protection seven of the eight specimens of blood from oxen showed immunity but the blood of sheep and pigs was negative. Viscerotomy was issued at nearly all stations but in no case did liver tissue examined show any of the changes characteristic of yellow fever (see this *Bulletin* 1937 Supp. p. 48\*). As the presence of *Aedes aegypti* has been reported from every township of any size in the Protectorate special efforts are directed towards the reduction of the numbers of this mosquito.

As a result of the attention which the subject of yellow fever received at the Pan-African Conference in 1935 and the subsequent visit of Dr. SORRE of the Rockefeller Foundation (see this *Bulletin* 1937 Supp. p. 48\*) the Foundation decided to send a mission to Uganda to investigate the whole position. A team of workers under the direction of Dr. A. F. MAHAFFY arrived in October the laboratory previously occupied by the Human Trypanosomiasis Institute was placed at their disposal and research work was to commence as soon as necessary building alterations had been completed.

Recorded cases and deaths due to *plague* were 980 with 829 deaths as compared with 2,010 cases and 1,871 deaths in the preceding year. The whole of the Western Province was free from the disease, no district was affected in the Northern Province two in Buganda Province but cases occurred in every district in the Eastern Province where 637 cases and 595 deaths were recorded. The anti-plague measures in use in Busoga (referred to in this *Bulletin* 1937 Supp. p. 49\*) appear to have been successful and their introduction to other districts is under consideration. At the Kampala laboratory 11 carcasses of 1,570 rats were examined 4 being found infected with *P. pestis*. The Government Entomologist reports that the investigations into the relation between plague and cotton crop were continuing results showing no evidence of the alleged correlation. Two mus ferrets were imported from England for experimental use in the destruction of rats.

Cases of *typhus* fell from 656 in 1935 to 483 in 1936. Of the total cases recorded 238 occurred in the Western Province 274 were treated as hospital in-patients and 19 died. Only 2 non-fatal cases of *typhus* were reported and it appears that the universal use of the Carmie disinfectant (see this *Bulletin* 1936 Supp., p. 47\*) has proved most successful in eradicating the disease. The disease persists however outside the Uganda border and the importance of maintaining the apparatus in use is emphasized. A very considerable reduction

in the incidence of *cerebrospinal meningitis* is noted 360 cases with 130 deaths as compared with 1,318 cases and 469 deaths in the preceding year. The methods of individual segregation practised appear to have been at least as successful as the policy of prophylactic inoculation adopted in the Belgian Congo.

As reported in the 1935 Report an imported case of *smallpox* was discovered in Kampala during the latter part of December (see this *Bulletin* 1937 Supp. p. 49\*) and in spite of wide-scale vaccination and isolation of discoverable contacts further cases occurred among the native population. During the first three months of the year 32 cases with 5 deaths were recorded, no case occurring after the third week in March. An intensive vaccination campaign was embarked upon, 1,223,920 vaccinations being performed and the disease stamped out.

*Trypanosomiasis*—During the year under review 1,927 cases (as compared with 675 in 1935) were recorded with 58 deaths. It is believed a very large part of the increase may be attributed to the more extensive and stricter examinations carried out in the West Nile area, where 1,867 new cases were discovered. The Uganda shores of Lake Victoria are now said to be free except where the Protectorate boundary adjoins that of Kenya, and here it is impossible to determine whether the infection is kept alive by immigrants from that Colony or acquired by Uganda residents visiting Kenya—the boundary is purely artificial, and it is impossible to prevent every person from crossing from either side of the border.

As regards control measures, reclamation of lake shores from tsetse infestations is the policy actively followed. demands include the clearing of foreshores for prescribed depths and widths sufficient to ensure complete protection from fly, the proper siting of settlements, control growth of crops, gland examination of prospective settlers, etc. It is hoped that controlled re-occupation will gradually render areas unsuitable for habitation by tsetse, though it is pointed out that re-occupation except under strict controlled conditions might prove dangerous. In the West Nile area for example the movement of people with trypanosomiasis has resulted in the infection of a new river system believed originally clean.

In the Koich area (West Nile District) where the comparative value of attempts to eliminate fly by hand-catching or by debushing is under examination, so far the balance of evidence is in favour of debushing. The Government Entomologist reports that during the year surveys covering a considerable portion of the Gulu district were carried out, outstanding findings of these surveys included—(a) the low density of *G. palpalis* in most parts of areas surveyed, (b) the wide distribution of *G. palpalis* in low concentrations west of a named road, with (c) the presence of *G. morsitans* in some numbers in the northern area east of the road, and (d) the discovery of *G. palpalis* in small numbers along a stretch of stream practically treeless but margined by tall elephant grass.

*Tuberculosis* was responsible for 490 cases of the pulmonary and 86 cases of other forms of the disease, of the former 272 received treatment as hospital in-patients and 89 died, while among the remaining 88 cases 52 were hospital in-patients and 52 died. Reported cases are fewer than in 1935, for during the year under review no dispensary records are included. At the Laboratory where 1,791

HOOPER (R. C. D.) & LOWENTHAL (L. J. A.) A Survey of Health Work in Teso, Uganda—*Annals of Trop Med and Parasitology* Vol 30 p. 17  
 WILSON (W. A.) The Controlled Experiment in Medicine.—*East African Medical Journal* Vol 13 1936 p. 164

*Financial*—Expenditure on medical services during the year under review amounted to £164 765 a sum which represents 9·6 per cent. of the total revenue of the Protectorate in the same year

## TANGANYIKA TERRITORY (1936)

Tanganyika Territory consists of that part of former German East Africa which is administered under a Mandate by His Britannic Majesty. It lies between the Great African Lakes and the Indian Ocean, and adjoins Kenya and Uganda on the north, the Belgian Congo on the west, N. Rhodesia and Nyasaland on the south-west and Portuguese East Africa on the south-east. The total area is about 365 000 sq. miles. Dar-es-Salaam is the capital and chief port, other important towns are Tanga, Tabora, Dodoma, Moshi and Arusha.

*Vital Statistics*—Dr R. R. SCOTT, Director of Medical Services, emphasizes the importance of having available reliable facts relating to the density and local distribution of the population and natural increase of the different tribes and races. He recommends that from 1941 the census should be taken at quinquennial intervals, for with more frequent enumerations the prejudices of primitive peoples against these countings would gradually tend to disappear. The most recent population figures result from the 1931 census viz. 5,022,640. No reliable data relating to births, deaths or infant mortality are available. In these circumstances Dr Scott quotes from an unnamed source in the following terms: "The collection and accurate recording of vital statistics is directly comparable to commercial book-keeping without which no enterprise can hope to succeed."

*European Officials resident* numbered 950 with an average number resident of 599. 9 were invalided and 5 died. *Asian Officials resident* numbered 1178 and the average number resident 880 in this group 7 were invalided and 5 died.

The mean effective monthly strength of the *Kings African Rifles* was 1168, nine invalidings and six deaths were recorded among native troops. *Maternity and Child Welfare Work* is carried on at 13 special clinics maintained by Government and by Missionary Societies—some of the latter with financial aid from Government. In Tanga Town the new Maternity and Child Welfare Clinic was brought into use. To this clinic the progressive native administration of Pare sent three native women for training as health visitors; they are now doing useful work in the district. The distribution of these Clinics is as follows:—

*Central Province*—Five Clinics maintained by Church Missionary Society. *Eastern Province*—One maintained by Government and one by Church Missionary Society. *Lake Province*—One each maintained

by African Inland Mission Church Missionary Society and White Sisters Mission *Tanga Province*—One Government Clinic and 11 Eastern Province two Government Clinics

Government contributions are made to Mission centres in order that large numbers of obstetrical cases may be made available for the training of native midwives though it is inevitable that in order to secure the confidence of mothers the treatment of minor ailments of women and children must be undertaken in the early stages of the latter work tends to absorb a disproportionate amount of time and energy at present. At these centres the record of work during the year reads—clinic confinements 3 614 new cases treated of mothers 30 689 and of children 49 648 total attendances recorded 471 606

*School Hygiene*—The references to this branch of work are rather fragmentary appearing only in abstracts from the Reports of two Medical Officers. In Dar-es-Salaam school medical inspections were conducted by the health officers and the Sister in charge of the Central Clinic and a large number of cases of dermatitis and ringworm of the scalp discovered. In Tanga Province 460 pupils were examined 37 were found to be suffering from bilharzia and 22 from ankilostomiasis

*Public Health Sanitation etc*—The year's work is described as one of consolidation. The reorganization of Medical Department activities on provincial lines was continued (see this *Bulletin* 1937 Supp p 52\*) and will be extended as circumstances permit. The Report under review contains a full survey of existing medical facilities and calls attention to areas where medical needs are not adequately met. The position is being examined by Government with a view to discovering how medical services can be extended in those areas in which needs are greatest. Extracts from the reports of provincial and certain district medical officers are a feature of this Annual Report

Preliminary construction work was commenced in connection with the new sewerage scheme in Tanga township. Again the urgent need of the provision of a sewerage system for Dar-es-Salaam is emphasized (see this *Bulletin* 1937 Supp p 53\*). In the native area of Dar-es-Salaam a number of experimental unlined bore-hole latrines were constructed similar work is being or has been carried out in other parts of the Territory. Refuse disposal by the method of controlled tipping was continued with success many holes have been filled and much low-lying ground brought up to a proper level by the application of this method of dealing with collected refuse. Anti-malarial measures continued to be actively carried out during the year the programme of the Malaria Research Unit (financed by the Colonial Development Fund) in Dar-es-Salaam was completed and thenceforward anti malarial work became the responsibility of the Health Department a grant of £27 000 was made from the Colonial Development Fund for anti malarial drainage work in the area. Representations were made for a masonry surface drainage system to replace existing earth drains in Lindi township. The gradual increasing salinity of the Dar-es-Salaam water supply is commented upon by the Government Analyst. The public water (1936)

*Cerebrospinal fever* has shown a steady increase during the past three years the main focus of infection being apparently across the Western border in Belgian territory. The adjoining district of Uha in Kilgoma district was declared an infected area while cases also occurred in the Southern, Northern Lake and Tanga Provinces. Altogether 179 cases with 114 deaths were recorded and of these 104 cases and 68 deaths were reported from Biharamulo district and 51 cases with 37 deaths from the Kilgoma district. Every possible local preventive action was taken and instructions were circulated with regard to measures necessary to prevent the spread of infection.

*Plague* was responsible for 16 cases and 9 deaths 8 cases and 3 deaths being reported from Iringa in the Southern Province and 8 cases with 6 deaths from Maswa district in the Lake Province. Plague inoculations were administered to natives and anti-rat measures carried out in the infected areas. *Typhus* was recorded in three Europeans in the Lupa Goldfields area. The vector was not determined but was believed to be either a tick mite or flea. *African relapsing fever* gave rise to 1 739 cases and 7 deaths. Of the total cases recorded 280 were treated at the single hospital at Kilgoma in the Western Province where the disease is said to be unusually common. Ticks are found in great numbers in native houses research work into the ecology of *Ornithodoros moubata* is urgently required if the pest is to be dealt with effectively. No cases of yellow fever were recorded and the only mention of the disease appears to be by way of a Government pamphlet prepared for distribution, e.g. "A further Note on the Yellow Fever Situation in relation to Tanganyika Territory". The usual Table supplying the *Aedes* index for the year appears in the Report (see this Bulletin 1937 Supp. p. 50\*).

Cases of *enteric fever* treated at Government Hospitals totalled 96 with 18 deaths, distributed as to 78 typhoid and 18 paratyphoid fever. European patients numbered 21 and one died. The greatest number of cases—19 with 4 deaths—occurred at Morogoro in the Eastern Province. In that area an epidemiological survey was carried out by Dr SNAK of the Mtwapa Laboratory samples of water faeces etc. and isolated pure cultures of bacteria from possible sources of infection were collected and the cultures forwarded to Dar-es-Salaam for identification—the findings being detailed in the report of the Senior Pathologist. Among 218 sera from humans 62 agglutinated *Bact. typhosum* 23 *Bact. typhosum* and *Bact. paratyphosum* A and B 13 *Bact. paratyphosum* A and 7 *Bact. paratyphosum* B. Of *dysentery* 1 709 cases with 15 deaths were recorded, the distribution of types of infection being 627 amoebic 72 bacillary and 1,010 undefined. 385 of the cases were treated as inpatients and of these 43 were Europeans.

The incidence of *trypanosomiasis* continues steadily to decline and though a new outbreak was reported south of the Rufiji River in the Southern Province cases reported in the territory as a whole numbered little more than half the numbers notified in 1935 during the year under review cases numbered 536 and deaths 384. In the Central Province the pressure of tsetse on all sides of the cattle-raising area is severe some settlement of cleared areas is taking place but where such ground is not quickly occupied it soon reverts to bush. In the Western Province the success of the concentration policy in helping

to reduce incidence of the disease is again commented upon (see this Bulletin 1937 Supp p 57\*)

The Colonial Development Fund Committee generously donated £11 726 for the continuation of trypanosomiasis research under Dr J F CORSON for the Tinde Laboratory this will allow the work to be carried out until 1941. Dr Corson's work includes investigation of the transmissibility of *Trypanosoma rhodesiense* through sheep by *Glossina morsitans* of *T. gambiense* through monkeys by *G. morsitans* experiments designed to determine whether the species of vertebrate host influences the rate of infection in flies and work on the reaction of *T. rhodesiense* to normal human serum. Published papers include the following —

- CORSON J F A Note on Hyrax and Dikdiks (*Rhynchotragus*) from Areas Inhabited by Tsetse Flies — *J Trop Med & Hyg* 1936 Vol. 38 No 12 pp 125-26  
 — Antelopes as Reservoirs of *Trypanosoma gambiense* (Correspondence) *Trans Roy Soc Med & Hyg* 1936 Vol. 29 No 6 p 690  
 ACLEAN G Notes on Trypanosomiasis — *Quart Bull Health Org* 1936 No 1 pp 179-81

**Tuberculosis** — All forms of the disease gave rise to 3 044 cases with 102 deaths during the year under review. Of the totals recorded 1 934 cases and 84 deaths were due to the pulmonary form of the disease and it is further noted that 1 243 of the pulmonary cases and 18 of the deaths occurred in the Northern Province where it is said tuberculosis work among the heavily infected people on Kilimanjaro is making some headway. It is said that African cases admitted to the state of the disease with extensive affection of both lungs — the death rate is consequently very high in the Lake Province on the other hand the disease is comparatively rare.

The Tuberculosis Research Officer Dr C WILCOCKS continued his survey of the incidence of the disease throughout the territory. The funds generously provided by the Colonial Development Fund Committee for this work came to an end in 1937. A final report summarizing the work since its commencement in 1930 is in the printer's hands but brief references to some of the findings are contained in the report under review. Among other results it is noted that bovine tuberculosis is not at present a factor of importance in the spread of human tuberculosis in the territory that the largest number of human cases occur between the ages of 15 and 35 and that an alarming amount of collapse therapy is being undertaken in selected areas.

The nucleus of a village settlement on the lines of Papworth being laid out in Kibongoto.

The incidence of *Helminth* infestations remains high in many of the out-districts. During the year 17 555 cases of *ankylostomiasis* 17 914 of *taeniasis* 16 135 of *ascariasis* and 3 733 of *schistosomiasis* were treated at various centres. Both *Schistosoma haematobium* and *S. mansoni* are said to be very common in the Lake Province. During 1937 Dr Alan MOZLEY a research worker from the London School of Hygiene and Tropical Medicine is to conduct a survey of the snail hosts of the schistosome once their habitat is known it should be possible to devise suitable measures for their destruction (see also under *Scientific* hereafter) At Mbulu in the Northern Province it is

said 80 per cent. of the natives suffer from tapeworm infection owing to their habit of eating raw meat. The results of laboratory examinations of faecal specimens are as follows —

Item	Laboratory		
	Dar-es-Salaam	Sewa Hadji Hospital Dar-es-Salaam	Mtwapa
Ova of <i>Ankylostoma</i>	271	1,325	2
" <i>Ascaris</i>	14	22	—
" <i>Trichuris</i>	2	28	—
" <i>Oxyuris</i>	4	—	—
" <i>Taenia</i>	1	46	—
" <i>S. haematobium</i>	3	—	—
" <i>S. mansoni</i>	2	7	—
Other organisms, etc	9	17	2
Negative	380	1,515	40
Total	686	2,960	44

*Leprosy* — At the 31 Leprosy Settlements in the territory there are about 3 400 inmates (see this *Bulletin* 1937 Supp. p. 58\*) A Sister of the Universalities Mission is said to be doing useful leprosy work in the Newala and Masasi districts of the Southern Province where the disease is said to be prevalent while good work is also being done by the Benedictine missions at Ndanda near Songea. A pamphlet "Leprosy" is published and distributed by the Government Medical Department. At the main Laboratory Dar-es-Salaam where 382 nasal and skin smears were examined 205 were positive with *M. leprosa* at the Sewa Hadji Laboratory out of 19 smears 4 were positive.

*Veneral diseases* — During the year under review 39,503 cases of syphilis and 9 619 cases of gonorrhoea were treated 23 484 of the syphilis cases being dealt with at Government institutions and the remainder at mission centres in receipt of Government assistance in the form of drugs, etc. According to official returns there were only 17 European cases of syphilis and 47 of gonorrhoea and other venereal diseases. There were also 101 179 cases of yaws 70 682 of these being treated at Government treatment centres and the remainder at Medical missions. At the main Laboratory Dar-es-Salaam 1,074 specimens of serum were submitted to Wassermann and Kahn tests resulting in 334 positive Wassermanns and 390 positive Kahns.

*Other diseases* commented upon include the following. A fatal case of human rabies the first recognized pathologically since the war occurred in a native veterinary guard at Mtwapa. It is said the existence of infection might account for the unexplained death in Edinburgh in 1935 from rabies, some six months after leaving the territory of a veterinary officer who had been working in the district. Six cases of *diphtheria* with 2 deaths occurred among Asians in Dar-es-Salaam. no carriers were found among contacts. Out of 122 throat swabs examined at the Laboratory 6 were positive with

*C. dysphtheriae* this is the first occasion on which the organism has been isolated in Dar-es-Salaam since 1929. Cases of *beriberi* occurred among estate labourers at Kibaranga and among the general population of the Usambara area in Tanga Province and 4 deaths were ascribed to this cause. The disease was attributed to the eating of old and musty grain from the previous year's crop. *Scurvy* is said to be common in the Southern Highlands Province—the majority of cases occurring among new arrivals to the diggings. 329 cases appear in official returns. The Medical Officer Morogoro observes that *faulty nutrition* is the root cause of a large proportion of the sickness encountered and that following improvements in hospital diets striking changes for the better were noted in the condition of patients while the Medical Officer Musoma in the Lake Province states that *deficiency disease* was only observed in prison inmates and that all cases cleared up with improved diets. It is interesting to note that the District Officer Ulanga Mr A. T. CULWICK and his wife are collecting valuable information about the diets of the rice-eating people in the Kilombero Valley and Mr HARTNOLL has conducted enquiries into food supplies and the rotation of crops in the Dar-es-Salaam district. Methods of agriculture and the improvement of food supplies are engaging the attention of the authorities.

*Scientific*—From the Annual Report of the Laboratory and Research Division it is noted that the volume of work dealt with during the year under review again exceeded the record of 1935. Arrangements were made for opening a branch clinical laboratory at Tanga and with this extension there are now four separate laboratory units functioning within the Laboratory and Research Division. It is stated that accommodation at the central laboratory Dar-es-Salaam still remains inadequate for convenient working.

There was a large increase in the routine work undertaken, 28 647 specimens of various kinds being received, examined, and reported upon. Since to deal with the larger volume of work no increase of staff was possible research work had to be reduced to the minimum. The more important specimens dealt with and the findings recorded have already been the subject of brief mention under such headings as *Public Health malaria enteric fever trypanosomiasis etc.* in the preceding summaries and it remains to add a word or two covering the special investigations undertaken.

Dr D. E. WILSON continued his work in *Brucellosis* and the results of the work are in the printer's hands. Both *Br. melitensis* and *Br. abortus* types of undulant fever exist in the territory. An interesting observation so far incompletely solved refers to the apparent change in type of a *Br. melitensis* to *Br. abortus* when passed through a pregnant heifer. The work concerned with *ankylostome infestation of beaches* in Dar-es-Salaam was continued as was the study of *native poisons and medicines* (see this Bulletin 1937 Supp. pp. 58\*–59\*).

The finding of living and active *trypanosomes* in enormous numbers in the ascitic fluid of an African boy of about 14 years of age is an unusual case commented upon. The trypanosomes remained alive in the fluid for four or five days though when rats were inoculated with the fluid and the patient's blood trypanosomes did not develop in the rats.



Contributions by the staff to Scientific Literature included the following —

- BURKE-GAFFNEY H J O'D An Outline of Clinical Pathology for African Medical Assistants—*Government Press Dar-es-Salaam*.  
 WILSON D E and HARI SINGH A case of human rabies in the Central Province of Tanganyika—*East African Medical Journal* September 1935  
 — and EVANS, S A The Passage of Human and Monkey Strains of *Br. melitensis* through pregnant Heifers—(In the Press.)  
 RAYMOND W D Native Maternal Medicine II—*Tanganyika Notes and Records* Vol 2 p 50  
 CALDWELL, H C A Case of Congenital Relapsing Fever.—*East African Medical Journal* 1936 Vol. 12 No 11 pp. 347-48.  
 CHILTON \ A Description of the Common Parasitic Diseases of East Africa, with Notes on their Diagnosis and Treatment for Swahili-speaking Rural Doctors—1936 Government Printer Dar-es-Salaam  
 RAYMOND W D The Poisonous Effects of some Local Species of *Euphorbia*—*East African Medical Journal*. 1936 Vol. 12. No 12 pp 369-74

*Financial*—Actual expenditure on Medical Services for the year amounted to £185 687 as compared with an estimated expenditure of £190 783 Medical expenditure represents 11.7 per cent of the territorial expenditure during 1936 In addition the Colonial Development Fund Committee provided £5 169 for Malaria Research £1,824 for anti-malaria works Dar-es-Salaam £1,749 for Tuberculosis Investigation and £1 631 for Sleeping Sickness Research

### NYASALAND PROTECTORATE (1936)

Nyasaland Protectorate consists of a strip of land about 620 miles long by 50 to 100 miles broad lying to the west and south of Lake Nyasa. Its neighbours are Northern Rhodesia to the west, Tanganyika to the north and north-east and Portuguese East Africa to the south. Its total area is approximately 37,596 sq miles of land and 10 353 sq miles of water and its chief towns are Blantyre, Lilongwe, and Zomba (the headquarters of the Government)

*Vital Statistics*—Under this heading Dr A D J BEDWARD WILLIAMS Director of Medical Services observes "It is difficult if not impossible to assess the effectiveness of the work of the Medical Department in regard to the general health of the population except by reference to its vital statistics" Records of births and deaths have been maintained in the Fort Manning District since May 1933 and excellent work has been accomplished In 1935 similar efforts were applied to the Haronga District but unfortunately the work had to be curtailed owing to shortage of medical staff Another important medico-statistical enterprise implemented in Nyasaland takes the form of *Medical Surveys* and a considerable mass of most valuable information has been assembled as a result of these commendable enquiries. (These matters were mentioned in this *Bulletin* 1936, Supp pp 58\*-59\* and 1937 Supp. pp 63\*-64\*) Extracts are given from Medical Officers' Reports concerning the results of three Surveys and in one case relating to the Survey of the West Nyasa District a particularly

interesting and full account is contributed by Dr D P TURNER, Medical Officer of the area. Of the Medical Surveys Dr BEDWARD WILLIAMS says "Medical surveys it is true give a clear indication of the extent of invalidity but the scope of medical surveys is necessarily small and affects only a minute proportion of the population in any one year. These accounts should be read in their entirety since limits of space prohibit anything more than brief mention of these really admirable enterprises in these pages. The available facts relating to Nyasaland as a whole read as follows -

Race	Population	Births	Deaths
Europeans and Whites	1,838	35	18
Africans	1 619,530	Not known	Not known
Asiatics	1,558	71	18

The following data relate to the Fort Manning District (see above)

Population (approximate)	35 000
Births	7,882
Birth rate	46.8 per 1 000 population
Deaths	3 439
Death rate	21.8 per 1 000 population
Infant Mortality Rate	82.3 per 1 000 live births

*European Officials* resident numbered 269 with an average number of 206. Four were invalided and one died. *Native Officials* (including Native Troops and Police) numbered 2 603 nine died during the year.

*Maternity and Child Welfare Work* — Progress was seriously hampered chiefly owing to financial stringency. Only 104 confinement cases were dealt with at Government Hospitals and of the total only 28 were normal labours. As no women Medical Officers are employed by Government and no European nurses at any Government African Hospital with the sole exception of Zomba, it is difficult to persuade pregnant native women to attend treatment centres to provide necessary treatment for the babies or young children or even to make provision for the training of native girls and women as midwives and welfare workers. The maternity and infant welfare centres established in 1935 in the African Hospital, Zomba (see this *Bulletin* 1937 Supp. p. 62\*) and at the Jeanes School, are the only Government places where an active interest is taken in the welfare of women and children. With aid from the Colonial Development Fund three welfare clinics and three houses for health-sisters were erected, but lack of financial assistance from Government funds made it impossible to make full use of the buildings. Facilities for training and increases in the European nursing and health staffs are urgently needed.

Dr Turner supplies a series of facts relating to mothers and infants in the West Nyasa District (see Medical Surveys above). His records show for 472 mothers 1,952 births or an average per woman of 4.6 of the total children born 997 were living at the time of the survey. Miscarriages are said to be very common and the taking of abortifacients a usual practice.

*Medical Missions* continued to carry out useful work at the three maternity and infant clinics subsidized by Government at these centres some training of native midwives is undertaken. The Blantyre Mission Hospital is to receive a Government grant in-aid to further the training of midwives.

The record of the year's work at various centres may be set out in the following manner —

Centre	Maternity Cases	Maternal Deaths	Infants on Registers	Infant Deaths
African Hospital, Zomba	11	2	219	—
Alinda Mission	83	1	417	42
Blantyre "	159	11	240	210
Bandawe	23	—	65	—
James School	13	—	—	—

*School Hygiene*—Owing to unusually high incidence of sickness among the qualified medical personnel, the programme of work had to be curtailed. The three European schools were inspected and 27 boys and 40 girls examined improvement in the dental condition of the Blantyre and Limbe pupils was recorded in Zomba 90 per cent. of the children showed enlarged or unhealthy tonsils. The pupils attending three other schools were examined results being set out in some detail these included —

(a) *The Providence Girls School Alenje* where 83 pupils were examined data are presented relating to ages heights, weights blood films positive for malaria parasites with percentages for each type of infection stools positive for hookworm urines positive for *S. Asmatobium* palpable spleens, etc.

(b) *Kota Kota School* where 111 girls were examined results are given of blood examinations for the presence of malaria parasites stools, and urines, and spleen examinations.

(c) *The Catholic Institute Blantyre* 58 pupils examined conditions described as regards nutrition skin diseases teeth, tonsils, blood and urine examinations.

In his Report of the Survey of the West Nyasa District Dr Turner (see *Medical Surveys* above) tabulates the results of his examinations of 707 children ranging from 0-10 years of age various abnormalities are recorded in absolute numbers and in percentages.

*Public Health Sanitation etc.*—Fortunately no serious epidemic outbreaks menaced the health of the people during 1936 during which year considerable departmental reorganization was in progress. In the Districts, while curative medicine was well maintained, emphasis was laid upon the importance of preventive health measures medical officers were encouraged to visit rural dispensaries frequently and to devote as much time as possible to the training of their native assistants.

Despite a continued paucity of funds a marked improvement in the sanitary condition of certain villages is reported. This is especially true of the Fort Maming District where many villages have been

reconstructed water-supplies improved and where itinerant inspectors maintain registers of births and deaths. The aim of the Medical Department is to develop health units centred on rural dispensaries as funds and staffs allow from time to time. As evidencing the progress made in *general sanitation* in the face of stupendous difficulties the following extracts from various sections of the Report and relating to different areas may be cited —

35 villages have been partially or completely reconstructed and sanitated.  
the completion of 470 latrines in one part of the district and of 40 in another

latrination of the district is proceeding steadily  
it is now the usual thing to find every hut with its own latrine.  
Water supplies are scarcely mentioned (see this *Bulletin* 1937 Supp p 65\*) Of one area it is said the only source of water supply is from holes dug by the natives alongside swamps. Endeavours are being made to improve these conditions.

Labour conditions received considered attention. With the permission of employers of labour medical officers visited estates and proffered advice with regard to general sanitation housing etc their suggestions were welcomed by the majority of estate owners. The conditions observed on four estates employing an aggregate of about 4,500 labourers are tabulated as regards housing latrine accommodation water supplies food, medical facilities. During the year 1,579 natives were medically examined for mining work in South Africa or in Southern Rhodesia. The number of emigrants proceeding independently in search of work to other territories is not known but in 1935 it was estimated that about 120,000 Nyasaland natives were abroad (see this *Bulletin* 1937 Supp p 65\*) A number of repatriated Nyasaland natives return each year during the year under review 1,472 returned from South Africa and a number from Southern Rhodesia all are medically examined on arrival in the territory.

Housing and Town Planning matters in the Protectorate are dealt with by a Central Town Planning Committee. In Zomba Blantyre and Limbe progress is reported in the establishment of model villages for the accommodation of natives. As regards food in relation to health and disease the adequacy or otherwise of native diets native methods of agriculture etc are among matters under investigation. Interesting facts relating to native diets have been assembled by medical officers during the course of their Medical Surveys. Dr H G FITZMAURICE contributes a particularly interesting and detailed account of native foodstuffs and diets in the Kota Kota District.  
Reports by district medical officers and sub-assistant surgeons describe measures taken to spread the knowledge of hygiene and sanitation these follow along lines previously described (see this *Bulletin* 1937 Supp p 65\*)

Recommendations — Dr Bedward Williams observes that since no great increase of funds or staff is likely to be forthcoming in the immediate future the problem facing the authorities is to devise an organization capable of effecting the greatest amount of good with the limited budgetary allowances available. In these circumstances the training of African personnel is of first-rate importance for native

assistants better educated trained to diagnose and treat minor ailments, and capable of taking charge of general hygiene and sanitation work in rural areas, are urgently needed steps have already been taken to this end but the scheme of training demands for its efficient implementation additional European instructors. The extension of maternity and child welfare work is especially emphasized and for the training of native midwives the appointment of a qualified female medical practitioner is considered necessary. Other requirements envisage the erection of a new European Hospital an up-to-date and well equipped laboratory and the appointment of a qualified European laboratory assistant.

The scheme of training *African Personnel* provides for the training of native female nurses native male dispensers and dressers, laboratory assistants, etc. Candidates are required to have reached a prescribed educational standard before they are admitted to take the courses extending over fifteen months. At the Jeanes' School Centre a number of welfare and community workers have commenced a two years course of instruction along lines suggested by the Medical Department.

[*Special Note*—The Medical Surveys frequently mentioned in these notes are a characteristic feature of public health work in Nyasaland and as such are worthy of special consideration. Results achieved by Medical Officers conducting these small-scale enquiries are excellent in every way and since it is quite impossible in these pages to do ample justice to reports of work accomplished in the course of these investigations, readers are recommended to turn to the descriptions supplied and read them in their entirety (see also this *Bulletin* 1937 Supp. pp 63\*-64\*)]

*Port Health Work*—A quarantine camp is established at Port Herald [on the Lower Shire River on the main railway line Beira to Blantyre and about 113 miles from Blantyre]. At this centre Asiatics and natives entering Nyasaland and who may have been in contact with infectious diseases or unable to produce vaccination certificates are dealt with. During the year 45 natives only were examined at this station.

*Hospitals Dispensaries etc*—Except that from time to time small additions improvements etc have been made to the European Hospitals there is nothing of moment to report (see this *Bulletin* 1936 Supp. p 61\* and 1937 Supp. p 66\*). At these institutions 165 persons received treatment as in-patients and 1,680 as out-patients. 3 hospital deaths were recorded. *Malaria dysentery diseases of the digestive system* continue to be among the principal ailments treated.

As regards the *Native Hospitals* the most noteworthy feature is the increase in female patients. This is particularly noticeable in the Zomba area where there are two European sisters and where the female wards are staffed with African females. The returns show a 31 per cent increase of female patients over the 1935 records. In-patients treated at all native hospitals numbered 9 757 with 250 deaths, hospital out-patients numbered 133 751 and cases treated at the 63 *Rural Dispensaries* 301 738. *Diseases of the skin digestive system respiratory affections malaria venereal diseases and helminthic diseases* were among the principal causes of ill-health recorded.

The usual grants-in-aid were made to Mission Hospitals for the treatment of natives sent to them by Government.

From the references to general morbidity experience in the text of the Report the following summaries have been compiled —  
*Malaria* cases reported from hospitals and rural dispensaries are stated to have totalled 16 002 distributed as to 177 Europeans and 15,825 Asiatics and Africans. Actual hospital returns however give the following details —

Type of Infection	Europeans		Asiatic and Africans		Rural Dispensary
	In patients	Out patients	In-patients	Out-patients	Out-patients
Benign tertian	3	12	32	301	—
Quartan	0	7	29	135	—
Subtertian	7	32	356	903	—
Cachexia	1	3	26	63	—
Undefined	12	123	353	4 650	10 773
Totals	23	177	796	6 052	10 773

By this showing it would appear that 17,821 malaria patients were treated. Eleven deaths among Asiatics and Africans were ascribed to the disease. Of *blackwater fever* 14 cases with 3 deaths were recorded. The chief vectors of malaria in Nyasaland are *A. gambiae* and *A. funestus*. The disease is hyperendemic over the whole territory with seasonal variations. In rural areas the efforts of the Medical Department have but little effect in reducing incidence but in the townships where anti-malarial works are effectively carried out a fairly satisfactory state of affairs is said to exist (see also this Bulletin 1937 Supp. p. 67\*).

At the Government Laboratory Zomba out of the 3,229 blood films examined 1 088 were positive for malaria parasites with the following findings—*P. falciparum* 796 *P. malariae* 230 *P. vivax* 39 mixed infections 29 and undefined 4.

The epidemic of *smallpox* which has raged with diminishing force during the past seven years has almost completely died out—183 non fatal cases only were reported. Vaccinations performed during the year totalled 236 085. Eleven cases of *cerebrospinal fever* were treated in native hospitals with 4 deaths. It is stated that an unknown number of cases also occurred in the districts where spasmodic outbreaks are reported from time to time but the infection does not appear to spread.

Hospital Returns show 2,545 cases of *influenza* with one death 538 of *relapsing fever* with one death 2 of *acute poliomyelitis* and one European case of *typhus*. Rabies of which 6 cases were recorded continued to be a source of unrest throughout the Protectorate. Numbers of persons who had been exposed to infection took advantage of anti-rabic treatment.

*Measles* is said to be widespread throughout the territory. During the year 1 191 cases of measles and German measles were reported. *Enteric fever*—The Report observes. Six cases occurred amongst Europeans and one case was reported amongst the native population. On turning to the Hospital Returns the reader finds 3 European in patients 3 European out patients 6 African in patients and one

out patient. Laboratory findings showed 4 positive agglutinations (out of 99 tests made) 3 with *Bact. typhosum* 1 *Bact. paratyphosum A*. As regards *dysentery* the Report states The total number of cases reported was 1 429 but Hospital Returns show that 1 708 in and out patients were treated of the total 363 were amoebic 71 bacillary and in 1 174 cases the type of infection was not defined. Out of over 6 000 stools of Africans examined for intestinal parasites 3 7 per cent. were positive for *E. histolytica*.

Of *tuberculosis* it is said 248 cases of all forms of the disease were reported. In-patients and out patients treated at Government institutions total 410 and of these 205 were suffering from the pulmonary form of the disease. In the opinion of most medical officers the incidence of the disease is increasing. It is noted that during the period 1932-36 among the 611 repatriated Nyasaland natives from Southern Rhodesia 64 or 10 4 per cent. were suffering from tuberculosis. The spread of the disease may be influenced by this factor of repatriated labourers, for it is not known how many such natives return each year from neighbouring territories and from South Africa. The control of the disease in these circumstances is difficult efforts are being directed towards localizing all infected persons.

Six cases of *trypanosomiasis* were reported. The Medical Entomologist Dr W A LAMBORN carried out examinations of the excreta of *G. morsitans* with a view to the further study of the flagellates sometimes passed by the fly. Flies known to be infected were also fed to certain animals and the blood of the latter examined from time to time. No positive results attended these experiments.

*Helminthiasis*—A year ago the findings of the Medical Surveys were referred to in these pages (see this *Bulletin* 1937 Supp. pp. 63\*-64\*) and the percentages of persons infected with hookworm and schistosomiasis etc. recorded. It is said that in the Milanje area 22 7 per cent. of all cases of illness treated in the native hospital were due to infection by either hookworm or bilharzia. The following details extracted from the Report under review indicate the incidence of these infections —

Institution	No Examined	Percentage infected with—		
		Hookworm	<i>S. mansoni</i>	<i>S. haematobium</i>
Providence Girls' School, Milanje	304	11 0	0 6	23 0
Boys' School, Karonga	230	25 3	19 0	65 0
Girls' School, Koto-Koto	111	46 0	16 2	77 5
Catholic Institute, Blantyre	88	72 0	1	46 0
Central Prison, Zomba	300	37 0	1	12 7

Hospital Returns show that in- and out-patients treated for *ankylostomiasis* totalled 12,783 for *schistosomiasis* 7 122, for *ascariasis* 853 and for *tacniasis* 34 (Little meat is eaten but when available is well-cooked). Of the total cases recorded only 4 occurred among Europeans. At the Laboratory where over 6 000 stool specimens of Africans were examined 31 6 per cent. were positive for hookworm 2 3 per cent. *S. mansoni* 0 1 per cent. *S. haematobium* 2 7 per

cent *ascaris*. Other faecal specimens to the number of 1 482 were examined and among the 586 positive findings 70·8 per cent. were hookworm 4·3 per cent *S. mansoni* 0·2 per cent. *S. haematobium* and 3·9 per cent *ascaris*.

**Veneral Diseases**—Clinics are established at Blantyre and at Zomba, but difficulty is experienced in persuading patients to attend for treatment to cure. During the year 4,244 cases were treated at hospitals and dispensaries only eleven of these at European hospitals. The distribution of cases was *sypilis* 3 134 *gonorrhoea* and its complications 1 101 and *soft chancre* 9. Many women in rural areas are said to suffer from venereal diseases but in the absence of native nurses or lady medical officers they are reluctant to seek treatment. Of the 4 472 cases of *yaws* treated during the year 2,862 were dealt with at Rural Dispensaries.

**Leprosy**—Government provides financial assistance to the 12 clinics maintained by *Missions* grants are made in proportion to the number of cases treated. At these centres during the year 182 patients were admitted, 646 were treated as in patients 19 died, and 58 were treated as out-patients. In addition 46 lepers received in patient treatment at Government Hospitals and 139 as out-patients at hospitals and dispensaries. No exact information as regards the numbers of lepers in the territory is available but observers are of the opinion the disease is increasing.

**Deficiency diseases** are the subject of a special note. During the year 43 cases of *pellagra* and 56 of *scurvy* were treated at various Government institutions. All the scurvy cases were reported from one district by a rural dispenser but later enquiries failed to reveal any conditions which would confirm the diagnosis and it was concluded reports of these cases were inaccurate.

**Four Special Reports** are included as Appendices to the Annual Report under review they are as follows —

(1) Dr H. G. Fitzmaurice with *Observations on the Native Foodstuffs and Diet in the Kota Kota District*. This contribution describes in considerable detail foodstuffs available methods of preparation amounts eaten daily etc. Anthropometric data relating to eleven illiterate schoolgirls are supplied. (2) Dr H. D. Cronyn's contribution is entitled *Spinal Anaesthesia with Special Reference to its uses in Nyasaland*. The advantages of spinal anaesthesia over inhalation anaesthetics are discussed technique employed is described. In a series of 50 operations 2 deaths occurred neither attributable to the anaesthetic. (3) Dr W. H. Watson describes three *Interesting Cases* (a) A case of *Gumma of the Cerebellum* (b) *Coronary Obstruction simulating Thrombosis* and (c) a case of *Tubes Dorsalis*. (4) Dr D. P. Turner submits his *Report of a Survey of the West Nyasa District*. This exceptionally interesting and comprehensive study was briefly referred to in the section 'Maternity and Child Welfare' above.

**Scientific**—Dr W. A. Lamborn, Medical Entomologist made a tsetse fly survey in the Northern Province he concludes that the recession of the fly from the Dowa and Fort Manning Districts has been maintained (see this *Bulletin* 1937 Supp. p. 69\*). Other surveys were directed to the discovery of the breeding places of the domestic species of flies in Zomba and Fort Johnston and for mosquitoes of the *Aedes* group and their near allies in the neighbourhood of the Chileka.



and Zomba aerodromes. In addition to sleeping sickness studies (see *Trypanosomiasis* above) other research investigations included work concerned with the transmission to man of *Treponema pertenue* by the fly *Musca sorbens* and the problem of the transmission of leprosy through the agency of the haematophagous fly *Musca sorbens* and the bug *Cimex* species. During the year Dr Lamborn published the following papers —

- "A possible Reservoir Host of *Trypanosoma Rhodesiense*"—*Brit. Med. Jour.*, 8th June, 1936  
 "The Experimental Transmission to Man of *Treponema pertenue* by the Fly *Musca Sorbens*, Weld."—*Jour of Trop Med and Hygiene* 15th October 1936

The Report of the Government Pathologist, Dr H. M. SHELLEY records that over 8 100 specimens were received and examined these included 3,229 blood films 1 482 faecal specimens, 1 143 urines, etc (Findings briefly mentioned under *malaria enteric fever helminthiasis* in these notes) The Sachs-Georgi test for syphilis proves reliable and shows a high incidence of correspondence with clinical observations 170 tests out of a total of 372 proving positive One hundred and eighty-seven specimens of blood from adult Africans were grouped (technique described) and three types determined the incidence of the blood groups in 144 members of four Nyasaland tribes was tabulated.

*Financial*—Total expenditure amounted to £48 035 as compared with the approved expenditure for the Department of £51 190

## ZANZIBAR PROTECTORATE (1936)

*Zanzibar Protectorate* off the East African Coast comprises the islands of Zanzibar and Pemba and the islets within their territorial waters Zanzibar is about 53 miles long by 24 miles broad with an area of 640 sq miles Pemba, to the north-east of Zanzibar is about 42 miles long by 14 miles broad The only town of importance is Zanzibar Town.

*Total Statistics*.—The estimated mid year population, on the basis of which birth and mortality rates are computed, was said to be 242,770 During the year 3,931 births and 4 092 deaths were registered the resulting birth and death rates being 16.3 and 16.8 per 1 000 respectively In this connexion it should be explained that all data relating to the population births, deaths etc are assembled by the Mudirs and forwarded through the Provincial Administrations That registration is faulty appears clear from some of the District records where birth rates range from 4.2 to 34.8 and death rates from 3.4 to 20.6 per 1 000 some of the figures carry little conviction Certain vital surveys carried out in limited areas during the year produced results rather suggestive of the fact that the population if not reinforced periodically by an excess of immigrants over emigrants may be diminishing

The *infant mortality rate* calculated on official records is given as 90 per 1,000 live births, but it is believed that the true rate is in the neighbourhood of 200 per 1 000 live births (see this *Bulletin* 1937 Supp. p. 70\*)

After commenting upon the unreliability of prevailing data the Report observes: "It has been practicable elsewhere in Africa to obtain relatively accurate statistics relating to births and deaths and the achievement of the same standard should not be impossible in the Zanzibar Protectorate."

*European Officials resident.* Two deaths were recorded. *Non European officials* resident numbered 475 with an average number of 431. Among these 5 invalids with no deaths were returned. The most common cause of sickness among both groups of officials was malaria, influenza and diseases of the respiratory system and of the skin.

*Maternity and Child Welfare Work.*—The intense conservatism of the people the lack of tribal organization and the superstitious faith in witch doctors are among the factors combining to intensify the numerous difficulties facing the authorities in their endeavours to cultivate and develop these important branches of public health work. Yet despite all difficulties serious attempts are being made to cope with the disabilities so prevalent among women and young children in Zanzibar and 1938 saw the first Lady Medical Officer to be appointed in the Protectorate commence work with the assistance of a trained European Sister a qualified Goan midwife two African semi trained nurses and other subordinates. Accommodated in special quarters daily clinics for women and children were held an ante natal clinic held weekly and infant welfare clinics twice weekly. All these activities are new ventures (see this *Bulletin* 1937 Supp p 70\*) and their immediate success (see this *Bulletin* 1937 Supp p 70\*) year plans were being considered so encouraging that by the end of the year along the lines previously described in these Summaries. During the year under review 475 women received treatment 410 live babies were born and 7 infant deaths were recorded. At the dispensary conducted at the *Mwambelala Maternity Home* 7,962 cases of various kinds were treated ante-natal attendances totalled 2,016 and post natal 2,729.

*School Hygiene.*—Special attention is being devoted to the medical inspection and treatment of school-children. During 1938 the routine examination of the pupils attending 12 rural schools was carried out when in addition to the usual physical examinations stools were examined for the ova of helminths and the serum of each pupil for blood smears were taken and examined for the presence of malaria parasites and the Kahn test applied to the serum of each pupil. The results of these examinations are set out in some detail but for present purposes it must suffice to say that among 701 pupils examined in Zanzibar schools 44 per cent of Africans and 55 per cent of Arabs were well nourished. 74 per cent of Africans and 36 per cent of Africans were described as cleanliness good. Dental caries is common and is almost universal the number of pupils with *A. duodenalis* and *ascaris* in their blood is not unduly high. Twelve per cent of Africans and 8 per cent of Arabs reacted positively to the Kahn tests. Standards of nutrition and cleanliness were not so high as in Zanzibar schools but the results of other examinations showed no remarkable differences.

The newly appointed Lady Medical Officer examined 82 pupils in Government Girls' Schools in Zanzibar. This is the first time this has been attempted and only the preliminaries had been completed by the end of the year enabling a few general remarks to be made.

Hygiene is taught in all Government schools, but the results of medical inspections show that its practical application leaves much to be desired.

*Public Health Sanitation etc*—Dr S W T LEE, Acting Director of Medical Services, contributes as an Appendix to the Annual Report an interesting account of medical progress in Zanzibar during the past 25 years.

Anti-malarial measures in Zanzibar and Pemba are now a matter of steady routine. As more funds and staff become available control will be extended beyond the town boundaries of Zanzibar and will include various swamps and streams which are at present the breeding places of anopheline mosquitoes. In Pemba special difficulties are encountered by reason of the fact that townships are encircled by ravines and swamps, and seepages are common.

Methods of *waste disposal* remain much the same as previously described (see this *Bulletin* 1937 Supp. p. 72\*). In the native area of Zanzibar town the odoriferous pit latrines and sullage pits are the usual feature. steady pressure is being applied to bring about improvements.

In the rural areas of both Zanzibar and Pemba a recent sanitary survey showed that only about one house in seven or eight had a latrine. Every effort is being made to emphasize the evil consequences resulting from the absence of these sanitary conveniences and to persuade the public to improve existing conditions in this respect. The responsibilities of the Medical Department include the *scavenging and removal of refuse* in the towns of both islands, no light task when it is observed that in Zanzibar town alone approximately 40,000 tons of refuse are dealt with each year.

With regard to *water supplies* in Zanzibar all the Arab masonry conduits from springs supplying the town have been replaced by iron piping and except for a few wells on the town boundary town dwellers use the piped supply. the quality of the water throughout the year being described as excellent. The Chem-Chem springs were taken into the general supply and some 3,000,000 gallons are now available daily. During the year a Paterson chlorinome was fitted at the Saateni Waterworks. In Pemba and in rural areas sources of supply remain as previously described.

The *sanitary inspection staff* comprises one European Sanitary Supervisor and 11 Asiatic and African Sanitary Inspectors. These officials carried out their duties efficiently but it is felt their numbers are insufficient and the addition of four sanitary inspectors has been approved.

In Zanzibar town *housing* conditions remain much the same as described in the preceding Report (see this *Bulletin* 1937 Supp. p. 72\*) except that efforts are being made to improve properties generally in the face of determined opposition from the owners. In the native area an endeavour has been made to enforce such regulations governing hut siting as can be implemented without causing hardship and to ensure that houses are provided with adequate

ventilation light latrines etc. In Pemba during the year the Medical Officer of Health assumed control of the building authority work in all townships. In the rural areas of both islands villages usually comprise a huddle of huts the chief need in rural housing lies in the provision of latrines (see above).

**Food**—Rural health surveys carried out during the year leave no room for doubt that generally the population is under nourished. Coconuts rice potatoes and cassava form the basis of all African poor Indian and working-class Arab dietaries most diets are deficient in proteins and fats. The Agricultural Department are endeavouring to improve the quality of local foodstuffs grown and are also engaged in investigating the possibilities of using large areas of country for pasturing cattle in order that meat milk and animal fats may become more generally available.

Health exhibitions lectures and demonstrations propaganda through the medium of the Press and distribution of pamphlets etc. are among the practices adopted in an endeavour to spread the knowledge of hygiene and sanitation.

**Courses of training for Sanitary Inspectors and Dispensers** are being held and are meeting with success. Other grades including porters mosquito searchers etc. are encouraged to attend night school and so merit promotion in the service.

**Port Health Work**—During the year 563 ships and 582 dhows visited Zanzibar 13,590 immigrants landed and 13,858 immigrants embarked no case of infectious disease was imported and no ships or passengers were quarantined. Aeroplane traffic is said to have assumed larger proportions during the year but no details are supplied.

**Hospitals Dispensaries etc.**—In Zanzibar Island there are six hospitals a leper colony and 15 sub-dispensaries all the hospitals are in Zanzibar town, and 13 of the sub-dispensaries in rural districts. Pemba Island has 3 hospitals in towns and 7 sub-dispensaries and a leper colony in the rural districts. The record of work carried out at these centres (exclusive of the Mental Hospital Leper colonies Poor House) reads as follows—Hospital admissions 4 413 total in-patients treated 4 961 at sub-hospital deaths 470 hospital out patient attendances 236 123 at sub-dispensaries 223 042.

It is noted that the majority of persons attending for treatment at Government hospitals are town-dwellers and that in remote rural areas the public rely mainly on the decoctions and enchantments of the local witch doctors. Among specific causes of sickness treated at Government centres during the year the following are selected for comment—

**Malaria** patients treated at Government Hospitals totalled 7 666 and 15 hospital deaths were ascribed to this cause. The distribution of types of infection among these patients reads 689 *benign tertian* 31 *quartan* 1 029 *subtertian* 178 malarial cachexia and 5 739 clinical diagnoses. At the Pathological Laboratory where 8 643 blood films were examined 2,538 were positive for malaria parasites and 803 undefined plasmodia—the latter classification comprising parasites which could not be assigned to a definite species comprising determination being impossible owing to the smallness of ring forms. Positive *quartan* films showed a considerable increase by comparison

with 1835 experience. In Zanzibar town where 1 625 cases of malaria were recorded, the incidence of the disease has declined considerably during the past three years. It is noted that 80 per cent. of the cases occurred among people resident on or near the town boundary outside which very little anti-malarial work has so far been possible.

Of *blackwater fever* 17 cases were reported with 2 deaths.

Under "*Public Health*" in this Summary, brief reference has been made to malaria control measures, which continue along lines previously described (see this *Bulletin* 1937 Supp. p. 73\*). So far as preventive measures in rural areas are concerned it is stated that so far they have not proved very effective and that there is no suggestion that in Zanzibar any more than elsewhere, any practical solution of the problem is in sight. Investigations into the general malaria problems of the country are being conducted by Dr. D. D. McCARTHY and his staff, and the results will be published in due course.

*Plague* and *cholera* formerly loomed large in the history of Zanzibar but no cases have been recorded in recent years. No rat proofing precautions exist but the matter has been raised by the Medical Officer of Health. Meanwhile rats are trapped regularly during the year 21,631 rats were caught (11,254 in Zanzibar Town) and 916 spleen smears examined in the Laboratory but no evidence of *P. pestis* was found.

Although no case of *smallpox* was reported, vaccination was speeded up during the year following news of an outbreak in Tanganyika Territory. 15,230 vaccinations were performed. Only one case of *dengue fever* and that in a European in Zanzibar Town and none of *typhus* or *relapsing fever*.

Only 8 cases of *enteric fever* were seen at Government hospitals but it is noted the Pathologist reports 30 positive Widal's out of 88 tests. In addition to the hospital cases 22 were reported by private practitioners, the increase probably resulting from the prosecution of a private practitioner for failure to notify an infectious disease. Of *dysentery* 80 cases with 4 deaths were recorded, the distribution of types of infection being amoebic 8 bacillary 26 and 19 unclassified. All were town cases. Water carriers are a potential menace by reason of their insanitary habits and milk hawkers are a danger but control is becoming more effective. At the laboratory cultures were made from faecal specimens in 125 cases of suspected bacillary dysentery resulting in the isolation of 19 *Bact. dysenteriae* Flexner and 4 *Sonnei*. *E. histolytica* was isolated in 8 out of 59 specimens examined.

*Tuberculosis* in Zanzibar usually implies *pulmonary infection* and during the year under review 204 of the 211 cases treated were of this form of the disease, while 49 out of 50 deaths ascribed to all forms of tuberculosis were due to phthisis. At the Walezo Tuberculosis Asylum where 84 patients were under treatment during the year 36 died and 32 were discharged, the Report observing "there were no cases discharged cured."

*Leprosy*—The abolition of the Leper Decree in 1936 and its various restrictive clauses appertaining to infected persons has been followed by the development of the two leper colonies organized and administered along lines designed to attract lepers the present policy embracing in the terms of the Report, attractive colonies, fair treatment to individuals and no compulsion. With the abolition

of the Funzi Island Settlement (see this *Bulletin* 1937 Supp. p. 74\*) an alternative colony for the use of Pemba lepers was established at Makondeni on high well-drained ground amid ideal surroundings. It is said that these colonies are popular new cases apply voluntarily for admission and no cases of desertion have been recorded. Details for the year read —

	Walero	Makondeni	Totals
Patients admitted 1936	23	12	35
Patients under treatment	62	65	127
Discharged	1	0	1
Died	9	8	17

Although specific treatment is given in some cases reliance is mainly placed upon good feeding healthy surroundings and a free life devoted to the cultivation of individual plots whose produce can be sold.

**Helminthic Diseases**—The only two of importance are *ankylostomiasis* and *schistosomiasis*. *Ankylostomiasis* is said to be almost universal in both islands and is a chief cause of disability. Every endeavour is made to bring home to the people the dangers of infection and how it can be avoided. Dispensers and sanitary inspectors in rural areas are devoting special efforts towards the installation of bore hole latrines. *Schistosomiasis* is present in both islands incidence being especially marked in Pemba. The disease is said to be tolerated by natives to a remarkable extent—infected persons think nothing of passing bloody urine for years even though many of them may live not distant from some dispensary or hospital. During the year under review 12 608 cases of *ankylostomiasis* and 550 of *schistosomiasis* were seen. At the Laboratory among 3,968 faecal specimens examined 1,587 were positive for *ancylostome* ova, other findings including *trichuris* ova in 535 cases and *ascaris* 168. Specimens of urine examined totalled 518 and of these 128 were positive findings for *S. haematobium*.

**Veneral Diseases**—Cases of *syphilis* treated during the year numbered 1,200 of *gonorrhoea* and its complications 1,568 and of yaws 4 689. According to official returns *gonorrhoea* incidence appears to have declined steadily but *syphilis* and yaws have progressively increased during the past three years. Yet the Report observes that every male adult has or has had *gonorrhoea* local people attach little significance to the condition and do not attend for treatment unless the attack is unusually severe—in these circumstances recorded cases can scarcely indicate the actual incidence of the disease. At the Laboratory Kahn tests totalled 3 724 and of these 834 or 22 per cent reacted positively.

**Other diseases** referred to in the Report include *ulcers* for this condition 22 417 persons were treated, 50 per cent. of the total occurring in Pemba alone. *Bronchitis* and *broncho-pneumonia* were responsible for 8,242 cases and accounted for two-thirds of all affections of the respiratory system. The 3,568 cases treated for *diseases of the eye* included 620 cases of *trachoma*. Negligible numbers of cases of *chickenpox* and *measles* occurred but the precautions adopted were successful in preventing the spread of these diseases.

*Scientific*.—In the preceding notes frequent reference has been made to Laboratory examinations and their results. During the year there was a marked increase in the total number of specimens examined the total of 21 484 including 8 643 blood films 3 968 faecal specimens, 724 Kahn tests 818 smears for the diagnosis of gonorrhoea etc.

*Financial*.—Total expenditure on medical services amounted to 45 472, a sum which represents 9.6 per cent. of the total revenue of the Protectorate during 1936.

### SOMALILAND PROTECTORATE (1936).

Somaliland occupies the "North-eastern horn" of the African continent, jutting into the Indian Ocean on the south of the Gulf of Aden. The boundaries have been settled by agreements with France, Italy and Abyssinia. The chief ports are Berbera, Balhar and Zellah, and its area about 68 000 sq. miles, or one-sixth larger than England and Wales together.

*Vital Statistics*.—The estimated native population remains unchanged from the census figure of 1931 viz 344 700. No vital statistics of any value are available for the registration of vital facts is not generally observed. The system of notifying deaths to the medical authorities in Berbera and six other townships has failed to achieve its objects, for deaths are not reported and burials take place without examination. Efforts are being made to devise an efficient system. Mortality data relating to the seven townships are omitted from the Report under review.

*European Officials* resident numbered 77 with an average number resident of 45. Two were invalided and one death was recorded. It may be noted that Government Officials and their families constitute the entire European population of the Protectorate. 37 non-official Europeans visited the country for business or pleasure during the year. *Asiatic Officials* resident numbered 68 with an average number resident of 56. One was invalided but no deaths were recorded within this group.

The following data relate to Troops and Police —

Item	Number on strength	Average number on strength	Invalidings	Deaths	Remarks
Troops S.C.C. (K.A.R.)	592	537	11 <sup>1</sup>	4 <sup>2</sup>	<sup>1</sup> Relapsing fever 1 unit, 11 <sup>2</sup> Pneumonia 2, Scurvy, Enteritis each 1
Police	793 (includes 192 special and temporary Police)	694	11 <sup>1</sup>	4	<sup>1</sup> Pulmonary tuberculosis accounted for 6 <sup>2</sup> Pneumonia 2, diabetes and anaemia each 1

*Maternity and Child Welfare Work*—A few normal and abnormal labour cases are treated in the hospitals but there is no routine antenatal work done nor can anything be attempted in this direction with out the appointment of a qualified woman worker (see this *Bulletin* 1937 Supp p 76\*)

*School Hygiene*—There are no English schools and the proposed station schools under European supervision (see this *Bulletin* 1937 Supp p 76\*) are not yet established. Little can be done at present as regards routine inspection or instruction in the elements of hygiene the year under review. It was also a good pasture year and the effect of this in the words of the Report automatically reduces the average numbers of those dwelling in the larger townships and lessens the incidence of diseases due primarily to dietetic deprivation.

As regards general hygiene and sanitation it is stated that Berbera is the only township having a *water carriage system* with sewage disposal to individual septic tanks and even this system applies only to European quarters and specified institutions. In other townships disposal is by the *bucket system* for European and Asiatic Government quarters while Indians Arabs and better-class Somalis living in permanent buildings usually have *pit-latrines* in the compounds of their houses. The bulk of the native population defecate in the open outside demarcated boundaries. In Berbera and certain other towns ships sanitation is under the control of the District Officer medical officers assisting with technical advice and routine inspections the system is necessitated by shortage of medical officers but is not wholly satisfactory. The single Asiatic Sanitary Inspector stationed in Berbera controls the sweepers who endeavour to maintain a superficial cleanliness of the town.

Berbera is provided with piped *water supplies* (see this *Bulletin* 1933 p 70\* Supp) but the water though bacteriologically pure is scarcely potable by reason of its salinity permanent hardness unpalatable taste and laxative action. European residents either install their own water softeners or obtain fresh drinking water from a source 25 miles distant. Pumped supplies have been installed at Sheikh Burao and Hargeisa.

The general conditions of *housing* have been summarized in previous issues of this Supplement (see this *Bulletin* 1933 Supp p 70\*) The medical department exercises very little control over the siting and erection of new buildings but attention is always paid to matters affecting individual or public health.

As regards *food* it is stated the native appears to be showing a more general tendency towards the consumption of such vegetables as onions. Diseases directly attributable to food contamination are said to be uncommon. The ever present danger of undulant fever is emphasized the issue of goats milk to Government institutions discouraged, and consumers advised to ensure careful boiling of the milk before use.

*Hospitals Dispensaries etc*—It is stated that established hospitals are in the main adequate for the purposes they serve though some are in bad state of repair and new premises will have to be provided in the near future. The record of work at these centres of treatment reads as follows—



Hospital	In-patients	Hospital Deaths	Out-patients
Berbera	645	15	13,978
Borama	368	3	8,137
Burao	932	19	10,304
Dirga o	158	3	4,370
Hargeisa	590	15	8,813
Shaksh	25	1	2,519
Zeljah	78	1	4,028
Totals	2,844	57	49,147

As compared with the records of the preceding year a small decrease in the numbers of in-patients but a slight increase in out-patient cases is noticeable. In this connexion it may be noted that in the early part of 1936 a small charge was imposed for in-patient treatments; this was not altogether popular and may have had the effect of encouraging out-patient attendances. On the other hand 1936 was a comparatively healthy year free from major epidemics and the fall in the numbers of in-patients may be held to reflect in part at least the better conditions of living prevailing during the year under review. Hospital figures however can only tell part of the story for the great medical problem in Somaliland is how to reach the nomadic people in distant grazing areas. It is suggested the solution might be found in the establishment of mobile dressing stations staffed by properly trained natives.

The notes which follow briefly summarize the principal diseases dealt with during the year and commented upon in the pages of the Report under review —

*Malaria* cases were considerably fewer 677 as compared with 1,151 during the preceding year. Of the total cases 580 were treated as in-patients, types of infection being distributed as to *P. vivax* 90 *P. malariae* 64 *P. falciparum* 396 and 10 malarial cachexia. 3 deaths were ascribed to malaria. Though the disease did not assume serious epidemic proportions in any part of the Protectorate it is endemic in many areas. The recorded figures are no reliable indication of the prevalence of the disease for only a small proportion of those infected are able to travel the long distances from their homes to hospital centres. Of these people it is added "they have not learned that quinine will cure the disease much more effectively than the prayers of a *Mullah* or a Koranic amulet strung round the neck. The usual routine measures concerned with the oiling of wells and standing water drainage etc. were actively continued. At the Laboratory, where 4,368 blood films were examined 78 were positive for *P. vivax* 100 for *P. malariae* and 442 for *P. falciparum*.

*Relapsing fever* appears to show a steady increase in the numbers of cases. During 1936 persons treated for the disease numbered 902 as compared with 843 in 1935. Of the total, 309 were in-patients and one died. In a special Appendix to the Annual Report, Dr E. M. CLARK contributes a special survey of the disease in some detail. It is stated that relapsing fever was introduced from Abyssinia and from 1916 continued to spread across the Protectorate. The town of Burao shows a particularly unenviable experience with a rapid increase from

a single case in 1927 to 618 in 1936 with a further increase expected in 1937 unless special steps are taken to combat the disease. According to Dr Clark only about 50 per cent. of patients receive hospital treatment among these the disease is mild in type with a mortality of about 0.6 per cent. Among untreated cases mortality is probably higher and in the opinion of Dr Clark from 50-100 persons die from this disease in Burao each year. One curious feature of incidence is that the numbers of cases are greatest between April and September each year when the population of the town is at its lowest level. Control could be made effective by the provision of well-built brick buildings with plaster walls, concrete floors and good roofs but without considerable expenditure it is difficult to know how the problem is to be solved. Meanwhile improvements have been effected by tick proofing some of the houses in Burao.

Smallpox was prevalent mainly in the Burao district and to a lesser extent in Barama the disease which was of a mild type made its appearance during the early months of the year but no case occurred after September in any district. Hospital records refer to 156 in-patient cases with 7 deaths. The outbreak was controlled by energetic vaccination and segregation 8,337 vaccinations being performed. The practice is observed of vaccinating all people from the interior before allowing them to enter the larger townships.

Tuberculosis (all forms) was responsible for 70 in-patient and 330 out-patient cases among in-patients there were 8 and among out-patients 155 cases of the pulmonary form of the disease. The Report observes only relatively few active cases are actually treated in the hospitals. Persons suffering from and treated for *bronchitis* and *broncho-pneumonia* numbered 989 and *pneumonia* 65 and among the latter 9 hospital deaths occurred.

Two non fatal cases of *typhoid fever* received in-patient treatment and there were also three non fatal cases of *dysentery* one of these being the amoebic form of the disease. Hospital returns also show that 470 persons received treatment for *enteritis* (with 5 deaths) and no less than 10 634 for *constipation*. The latter condition is said to be very common in the townships but even more common in the interior where camels milk is a principal item of diet.

At the beginning of the year there were 29 *lepers* in the special Leper Camp in Berbera during the year 7 were admitted 4 were discharged as non infective and one died leaving 31 inmates on the register at the end of the year. The Camp in Berbera is not entirely satisfactory and it is recommended that the settlement should be moved to a semi agricultural area and established on modern lines.

With regard to *helminthic diseases* it is stated the indigenous population of Somaliland is as it always has been, free from the common helminths. The 310 cases of tapeworm infestation treated during the year occurred among political refugees from across the Ethiopian frontier where the natives are beef-eaters and where the infestation rate is high. Strict sanitary precautions are designed to deal with the risks of spread of helminthiasis in the Protectorate.

In the return of *venereal diseases* there appear 434 cases of *sypilis* 183 of *gonorrhoea* and 9 of *soft chancres*.

As would be expected in a dry and dusty country *eye ailments* are very prevalent and 3 812 persons received treatment for eye affections.

of various kinds. Of the total 3 043 received treatment for *conjunctivitis* and 213 for *cataract*. *Trachoma* though met with is not common. 62 cases are reported in hospital returns.

Among other ailments treated it may be noted that while *ulcers* of the true tropical type are said to occur in fair numbers a very large proportion of the 7 728 cases treated under this title were really shoe galls or slight abrasions in the feet. Under *external causes* appear records of 7,316 cases of various kinds 4 782 of these being due to *injury by blow*. One case of *tick typhus* was diagnosed in a European Officer. No case of *rabies* was recorded during the year.

*Scientific*.—The Laboratory Report for 1936 tabulates the list of specimens received, and examined. These totalled 5,584 and of this total 4,366 were blood films (see above under *malaria*) and 258 were specimens of sputa of which 143 were positive for *B. tuberculosis*.

*Financial*.—Total expenditure on medical services amounted to £10 496 a sum which represents 6·7 per cent. of the total revenue and 5·3 per cent. of the total expenditure of the Protectorate during 1936.

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## NORTHERN RHODESIA (1936)

Northern Rhodesia lies north of the Zambezi River with Tanganyika Territory and the Belgian Congo to the north, Nyasaland and Portuguese East Africa on the east, Southern Rhodesia and South West Africa on the south and Portuguese West Africa on the west. The area of the Territory is estimated at about 237 950 sq miles and divided for administrative purposes into nine Provinces.

**Vital Statistics**—Though estimates of the native population were made for each of the years 1930-34 in the Report under review it is stated "There is probably justification for saying that the native population numbers something over a million and a quarter beyond that I would not venture to go and as no figure is obtainable for total births or total deaths that could be regarded as even approximately reliable no attempt has been made to calculate rates" (See also this *Bulletin* 1937 Supp p 79\*)

Knowledge of the *European population* is also conjectural. An estimate of 14 000 is stated to be "little more than a guess and does not justify the calculation of birth and death rates."

On the assumption that *European births* are correctly and fully registered there were recorded 313 and of *European deaths* 78 *malaria blackwater fever* and *accidents* were among the principal causes of death. There were six *European infant deaths*

*European Officials* resident numbered 611 with an average number resident of 536 the corresponding figures for *Native Officials* were 2,550 and 2,378 respectively. There were no invalidings or deaths among *European Officials* but 25 *Native Officials* were invalided and 13 died during the year under review.

**Maternity and Child Welfare Work**—At *European Hospitals* 185 women were treated as in patients for *diseases of the puerperal state* 142 being cases of normal labour at *Native Hospitals* the corresponding figures were 107 and 56 respectively. The addition of a maternity section separated structurally from the main building is a necessity at the Lusaka Hospital.

The four *Welfare Clinics* were maintained (see this *Bulletin* 1937 Supp p 79\*) The only records of work presented in the Report relate to two of these Clinics viz—

Clinic	Europeans		Natives		
	Patients	Attendances	Men	Women and Children	Attendances
Lusaka	179	354	2,423	4,335	30,979
Ndola	142	4 771	1,347	4,891	28 173

Reference is made to the large volume of successful welfare work carried out by the three copper mining companies a nursing sister and subordinate native staffs are employed by each of these concerns for work among the dependants of mines native employees.

It is observed that though hospital figures show a steady increase in the volume of work the latter is not indicative of increased morbidity but of increased confidence in and use of facilities available.

*Malaria* continues to be the chief cause of sickness among Europeans during the year 496 admissions to European hospitals were recorded and 493 cases were treated, with 2 deaths. All were subtertian infections. To hospitals for natives there were 1067 admissions, 1068 cases treated, and 25 malaria deaths registered here also all were subtertian infections. Of *blackwater fever* 14 cases among Europeans with 2 deaths and 2 non fatal native cases were recorded. It is stated that European cases of blackwater fever occur mainly among members of the poor Dutch farming community where standards of living and nutrition are very low.

Malaria was very prevalent in the new capital of Lusaka during the early months of the year. Steps were taken to drain the only permanent anopheles breeding place dangerously near the new township. Prison labour was employed with success. It is believed that an appreciable reduction in Lusaka malaria rate may be expected to follow completion of this work. As regards general anti-malarial works it is noted that the approved estimate for such services amounted only to £915.

Among the notifications of infectious diseases received were 22 European cases and 4 deaths due to *blackwater fever* (see above). Also there were 9 European and 24 native non-fatal cases of *typhoid fever*. Hospital Returns quote 9 European cases of *typhoid*, 3 of *paratyphoid undefined* and 6 native cases of *typhoid*. Notified cases of *dysentery* among Europeans numbered 24 of which 14 were amoebic, 3 bacillary and 7 undefined all were non-fatal. Among natives there were 194 cases with 3 deaths, distributed as to 38 amoebic, 17 bacillary and 139 undefined.

*Smallpox*—No case of *variola major* was reported but a small outbreak of *variola minor* occurred in the Masabuka District where 96 cases were recorded with no mortality. 10 712 vaccinations were performed. No case of *plague* was recorded (see this *Bulletin* 1937 Supp. p 82\*) *Cerebrospinal meningitis* gave rise to 15 native cases with 8 deaths 8 of the cases receiving in-patient hospital treatment with 7 deaths.

Notified cases of *relapsing fever* are said to have totalled 186 (see this *Bulletin* 1937 Supp. p 82\*) All were native cases and one death only was ascribed to this cause. It is noted that 21 cases were reported from Kasama 77 from Mongu and 90 from Fort Jameson making a total of 188.

*Influenza* was less prevalent and less virulent in type than in the preceding year. Four cases among Europeans and 693 among natives were notified, with 78 deaths among the latter. Though several small epidemics of *measles* were reported fewer cases were reported and mortality was less severe among children. There were 128 non-fatal cases among Europeans and 224 among natives with 16 deaths. Of *scarlet fever* 9 non-fatal European cases were notified, 30 cases of *whooping cough* among Europeans and 94 among natives, 8 European cases of *diphtheria* (one death) and 2 native cases.

Of *trypanosomiasis* the Report records 28 notified cases and five deaths of natives were ascribed to the disease (see this *Bulletin* 1937 Supp. p. 83\*)

Dr Haslam states that evidence is accumulating to show that *tuberculosis* is more prevalent than has been supposed. During the year under review 8 Europeans and 83 native cases of the disease (all forms) were notified of these totals *pulmonary tuberculosis* was responsible for 2 of the European cases with 1 death and for 75 of the native cases with 16 deaths. *Pneumonia* continues to menace the health of the native population at Government native hospitals where 351 cases of the disease were treated with 100 deaths 119 of the cases and 36 of the deaths were due to *lobar-pneumonia* while unclassified pneumonias were responsible for 188 cases and 47 deaths.

With regard to *helminthic diseases* it is stated that increasing information shows these diseases to be more prevalent than was realized (see this *Bulletin* 1937 Supp. p. 83\*) Hookworm infection is widespread but not severe. Medical Officers report the finding of ova by routine stool examinations in cases showing no symptoms of infection. *Schistosomiasis* both urinary and intestinal is common in some areas. Hospital Returns show 3 cases of *ankylostomiasis* among Europeans and 169 among natives 11 natives treated for *S. haematobium*; 88 for *S. mansoni* infections.

Reported outbreaks of *rabies* among jackals and dogs occur every year and give rise to anxiety and increasing expenditure upon vaccine for the protection of contacts. During the year under review 44 outbreaks were reported 21 being experienced in Mazabuka alone.

*Veneral Diseases*—Facilities for treatment remain as described in these pages a year ago. *Syphilis* continues to be as prevalent as ever in the Namwala District where there is no resident medical practitioner either Government or Missionary. Medical Officers comment upon the rarity of stricture as a sequela of untreated or partially treated *gonorrhoea*. According to Hospital Returns 4 Europeans received treatment for *gonorrhoea* natives treated included 2 073 cases of *syphilis* 242 of *gonococcal infections* and 3 of *soft chancre*. There were also 294 natives treated for *yaws*.

*Scientific*—Dr Haslam repeats last year's recommendation for the early provision of a medical laboratory (see this *Bulletin* 1937 Supp. p. 84\*) As matters stand only routine examinations of urine blood and stools were possible during the year. Native microscopists stationed at the large hospitals continued to do useful work, and those attached to the Lusaka Native Hospital under the supervision of Dr BOARD who is in charge of the newly established Native Medical Training School (see above) carried out 4 164 laboratory examinations during 1936.

*Financial*—Expenditure on Medical Department services amounted to £65 091 a sum representing 7.5 per cent. of the total revenue of the Colony during 1936.

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## SOUTH AFRICA.

## BASUTOLAND (1936).

Basutoland forms an irregular oval within the Union of South Africa the main axis, about 150 miles long, lying in a north-easterly direction. The Orange Free State Province, Natal and the Cape Province form its boundaries. It is mainly mountainous, and has an area of 11 718 sq miles, or nearly that of Belgium. The High Commissioner for South Africa is Governor of Basutoland.

*Vital Statistics*—The population shown by the Census of 1936 was distributed as follows—*Europeans* 1 434 *Bantu* 559,377 *Absentees* *Passes* 101,273 and *Coloured other than Bantu* 1 000 so that out of a total enumerated population of 663,684 Europeans numbered 1 434 Bantu 600 650 and Others 1,600. Vital registration applies to Europeans only—no records are available for any section of the native population (see this *Bulletin* 1937 Supp., p. 83). *European Officials resident* numbered 131. Though no deaths were recorded and only one official was invalided, 37 were on the sick list for one cause or another. Reference is again made to the probable contributory causes of ill-health and for the need of officials being enabled to take leave at regular intervals at coast levels or overseas.

*Public Health Sanitation etc.*—During the year Dr H. W. DYER, the Principal Medical Officer paid periodic visits to all Government Medical Stations to study at first hand the conditions of living of the population and of their medical needs. It is noted that for the whole territory there is one medical man to every 50 000 persons for the mountain population the proportion falls to one doctor for 60 000 people. With regard to *sewage disposal* sewage farms provided with necessary arrangements for dealing in a sanitary way with night soil by the bucket system have taken the place of the communal pit latrines serving the native villages at Leribe and Mole's Nek Government Reserves communal pit latrines in Government Reserves will gradually be replaced by the bucket system. In earlier Reports reference was frequently made to the insanitary state of practically all *water supplies*. The 1937-38 Estimates provide funds to render some 200 springs safe from surface pollution this programme will gradually be extended until all supplies are made safe. Every effort is made to ensure reasonable cleanliness, etc. in connexion with establishments engaged in the preparation and sale of foods and great improvements are recorded. All butcheries, bakeries etc. in Government Reserves are licensed and under the supervision of the local administrative and medical authorities.

*Hospitals Dispensaries etc.*—The seven Government Hospitals, having bed accommodation for 148 Natives and 12 Europeans, continued to function with success throughout the year. The inadequacy in accommodation (see this *Bulletin* 1937 Supp. p. 85) is being rectified to some extent the hospital at Quthas Nek is in process of enlargement and will have 23 beds in place of the present 14. A temporary hospital at Mokhotlong is in course of erection and additions to other hospitals are approved. In-patients admitted during the year totalled 3 189 and 3,293 were treated, with 178 deaths.

At the eight Government Dispensaries 54,015 new out-patient cases were recorded, with 82,952 attendances for treatment. The

increase in the number of cases does not necessarily indicate an unusual amount of sickness during the year. The people at large are more readily seeking the aid of Government Medical Officers and more money was in circulation enabling a greater number of people to find the small out patient fee chargeable for treatment.

*Training of Nurses*—A scheme for the training of Basuto Native Nurses has been brought into operation with Maseru as the training centre. Four suitable girls have commenced training as nurse probationers and accommodation is being built to lodge 12 such trainees. Upon completion of training these nurses will be posted to outlying villages to conduct confinements, small clinics and general welfare work.

The *Roman Catholic Mission Hospital* at Roma is complete and ready to function another at Ntates is under construction and the French Protestant Mission has commenced the building of a hospital at Morija.

A year ago in these pages reference was made to the absence of tropical and sub-tropical diseases from Basutoland (see this *Bulletin* 1937 Supp. p. 85\*). In the summer abundant suitable places for the breeding of anophelines exist though probably neither climate nor altitude are favourable. Similarly there are many places where molluscs thrive and where the *schistosoma* might be thought to find its intermediary host yet no case of schistosomiasis has been known to have been contracted in the territory though the disease occurs in neighbouring parts of South Africa where conditions approximate those of Basutoland. The following notes summarize references in the Report to communicable and general diseases that have occurred during the year under review.

*Plague*—In the previous issue of this Supplement a brief résumé dealt with the conditions which make Basutoland vulnerable to the disease. An outbreak occurred in the Mafeteng District in December 1935 and between that month and the end of February 1936 seventeen cases were recorded all proved fatal. The outbreak has been fully reviewed in the *Tropical Diseases Bulletin* 1938 Vol. 35 at pp. 748-749 and all that remains to say on the present occasion is that the epidemic of rodent plague among gerbilles was most effectively wiped out by the combined efforts of the Agricultural and Medical Departments.

*Typhus* was responsible for 51 cases only—the lowest incidence recorded for many years. It is thought that while energetic quarantine and deverminization methods have contributed towards reducing incidence the disease itself may have lost its virulence for it is stated the average native is just as heavily infested with lice and acquired immunity has become sufficiently effective to deal with the attenuated infection. In all Government Camps deverminizing and bathing establishments are available for natives and for all recruits leaving the territory for work in the mines.

Cases of *typhoid and paratyphoid fever* are said to have totalled 183. Among 46 in-patient cases with 11 deaths 44 were defined as *Bact. typhosum* infections and 1 each of *Bact. paratyphosum A* and *B* among 64 out-patient cases 60 were *Bact. typhosum* 2 *Bact. paratyphosum A* and in two cases the type of infection was not defined. The infection does not appear to be fly-borne for highest incidence occurs following the rains when fly incidence is low. Water supplies



contaminated by storm water through surface pollution appear to be responsible. Provision has been made for protecting supplies (see above *Public Health*) No mention of *dysentery* occurs in the text though hospital returns show 146 cases distributed as to 45 amoebic 45 bacillary and 56 undefined of the total 33 were treated as in patients and of these 13 were amoebic infections 7 bacillary and 13 undefined *Diarrhoea and enteritis* accounted for 2,035 cases, of which 1,875 occurred among children lack of sanitary conveniences, polluted water supplies, and flies were contributing factors.

*Tuberculosis*—The text of the Report refers to 811 cases as compared with 812 cases in 1935 but according to the returns of Diseases and Deaths, 874 cases were dealt with among in and out patients and of the total 537 were *pulmonary* 123 persons were treated as hospital in patients with 12 deaths and of these 41 cases and 7 deaths were ascribed to the pulmonary form of the disease. *Other respiratory affections* were responsible for 5,834 cases of which 241 were treated as in-patients among the total were 3,544 cases of *bronchitis* and 321 of *pneumonia*

*Food deficiencies* are believed to be the underlying cause of much ill health. Special reference was made in the 1935 Report to the incidence of pellagra (see this *Bulletin* 1937 Supp p 87\*) of which disease 242 cases were recorded during the year under review No definite conclusions have been reached as to the causative factors, though the maize theory cannot be ignored it is noted that among prisoners developing the disease the substitution of millet for part of the maize ration and addition of green vegetables rapidly cleared up the condition. Other diseases of nutrition included 69 cases of *scurvy* 30 of *beriberi* 274 of the *anaemias* and 17 of *rickets*

*Leprosy*—In an Appendix to the Annual Report Dr P D STRACHAN Superintendent of the Leper Settlement describes the year's work in some detail During 1936 admissions totalled 143 (these included 44 recurring cases and deserters readmitted) deaths 39 discharged patients 68 and deserters 39 leaving at the end of the year 684 patients in the Settlement a net reduction in the population of 23 Numbers have gradually declined since 1933 Dr R. C. GERVOD Medical Officer of the Leper Settlement carried out a leprosy survey in the Quthung and Qacha's Nek Districts, whence in recent years the greatest numbers of admitted lepers have come During the course of the survey 13 187 persons were examined and 42 lepers discovered. This work has been reviewed in the *Tropical Diseases Bulletin* 1938, Vol 35 pp 285-288 and requires no further reference in these pages.

*Veneral diseases*—It is said that though 6,864 cases of *syphilis* and 1,684 of *gonorrhoea* were dealt with during the year the figures do not necessarily measure the true incidence of these infections among the whole population From the tabulated hospital and dispensary returns the following data have been taken —

	In patients	Out patients
Syphilis	6	6,864
Gonorrhoea	16	1 684
Granuloma venereum	2	2
Soft chancres	—	90

**BASUTOLAND—**  
**BECHUANALAND (1936)**  
*Other diseases*—Those mentioned in the Report under review include 2,928 cases of *rheumatism* 48 of *malignant disease* 551 mild cases of *influenza* and 98 of *measles*. There were also 417 cases of *whooping cough* associated with much bronchial pneumonia in young children giving rise to a large number of deaths. These figures refer of course only to patients seeking dispensary treatment.  
*Financial*—Total expenditure on Medical and Sanitary Services during 1936 amounted to £48,932 the Lepet Settlement accounting for £17 765 of this sum.

**BECHUANALAND PROTECTORATE (1936)**  
 Bechuanaland is bounded on the south and east by the Union of South Africa, on the north by Southern Rhodesia and on the west by South-West Africa. It has an area of about 275 000 sq miles. The High Commissioner for South Africa supervises the affairs of the Protectorate.

*Vital Statistics*—A census was taken during 1936 and resulted in the enumeration of 260 064 persons among whom were 1,899 Europeans. There are still no vital statistics available for the native population but 26 European births and 11 deaths were recorded giving birth and death rates of 13.6 and 5.7 respectively.

*Maternity and Child Welfare Work*—The social and welfare work at Serowe continues to increase and the European Nurse in charge is beginning to find more work than she can reasonably cope with. During the year 579 births were visited and assistance given in cases of sickness etc. 139 maternity cases were attended and 228 expectant mothers attended the ante-natal clinics. Labour cases dealt with at the various hospitals numbered 245 as compared with 68 during 1935. This encouraging increase suggests that native prejudices and superstitions associated with childbirth are gradually being overcome and that the European Staff is securing the confidence of the natives.  
 The maternity and child welfare work conducted by the Lutheran Mission at Ramoutsa is also showing signs of success—more maternity cases have been attended and people are visiting the Nurse in increasing numbers.

*School Hygiene*—Schools were visited during the year and talks given to the children on such subjects as fly and mosquito breeding, elementary hygiene etc. Hygiene is now so important a subject in the school curriculum that a paper is set by the Medical Department for the examination of senior pupils. With the assistance of the St John Ambulance Association first-aid and home nursing are also taught to the senior classes. examinations will be held and successful candidates will be awarded the Junior Certificate and badge of the St John Ambulance Association.  
 At Khale a Refresher Course for teachers was given by the Medical Staff. the syllabus included lectures on hygiene first-aid child welfare plague and tuberculosis.  
*Public Health Sanitation etc*—Owing to the difficulty in obtaining suitable Medical Officers (see this Bulletin, 1937 Supp. p. 88\*) the matter was submitted to the Secretary of State for the Colonies with (1939)

the result that a more attractive salary scale was approved. Two Medical Officers were appointed and posted for duty with the Travelling Dispensaries (see below). Good rains were experienced during the year and although there was an increase in malaria incidence the general health of the people improved. It is suggested that water development by making sources of supply more numerous than at present might tend to break up the large *stadts* and lead to a more even distribution of the people over the country (see this *Bulletin* 1937 Supp. p. 89\*).

Since his appointment in February 1936 the Sanitary Inspector successfully organized the system of *night soil* and *refuse* removal at his headquarters at Lobatse. He also visited Chiefs and Headmen in the Districts during the year interested them and succeeded in persuading them to improve the sanitary condition of their villages. Assisted by the Police he inspected all hotels in the Protectorate during the early months of the year and as a result of these visits it was decided that the renewal of licences at the end of the year would be withheld unless certain minimum requirements had been complied with. These demands were met and the general sanitary conditions and standards of comfort have been raised as a result of these inspections. It was decided that these inspections will be repeated at regular intervals.

The Sanitary Inspector has two native pupil Sanitary Inspectors. There are vacancies for two more and these will be filled when suitable candidates are available.

In June 1936 by agreement with the Administration, the Seventh Day Adventist Mission took over the medical work of Ngamiland and thus released a Government Medical Officer for duty elsewhere in the Protectorate.

*Hospitals Dispensaries etc.*—There appear to be eight *Government and Mission Hospitals* and at these institutions 1 751 in-patients were treated and 80 hospital deaths recorded. At these centres and at out-stations, 68,342 attendances for treatment by *out-patients* were recorded, and of the total 25,332 were first attendances.

Two fully equipped *Travelling Dispensaries* (see this *Bulletin* 1937 Supp. p. 90\*) were commissioned during the year each in charge of a Medical Officer assisted by an adequate subordinate staff. The first of these mobile units is based on Mafeking and the second on Francistown. Practically all the main villages in the areas of their respective itineraries were visited and it is expected that these dispensaries will tour regularly for ten months of each year. During the year under review they recorded 2,591 attendances for treatment and of these 1,864 were first attendances, i.e. new cases.

With regard to *Medical Missions* it is again reported that excellent work is being done at the various Mission Hospitals and Dispensaries in the country and at all these centres records show a marked increase in out-patient attendances. In Ngamiland (see above *Public Health*) the Seventh Day Adventist Mission Hospital at Maun approaches completion extensions to the Dutch Reformed Church Hospital at Mochudi are being carried out and it is hoped that the proposed London Missionary Society's Hospital at Sofala will be erected during 1937. The building of the Mission Hospitals at Maun and Sofala was made possible by generous grants from the Colonial Development

Fund each of these hospitals will receive an annual subsidy from Government for their maintenance. Under the *Chamber of Mines Grant* (see this *Bulletin* 1937 Supp. p. 90\*) three native pupil dispensers two native female nurses and one native male nurse are undergoing training.

The principal diseases treated during the year under review are commented upon in various sections of the Report from some of these commentaries the following summaries have been compiled —

An increase in the number of cases of malaria is reported in 1,503 as compared with 835 in the preceding year. It is not suggested that cases seen and recorded by Medical Officers represent the whole tale of incidence and distribution of the disease for heavy outbreaks in the Francistown area. The 1 503 out patient cases treated included 1,238 *benign tertian* 258 *subtertian* and 7 malarial *cachexia*. Among 8 in patient cases resulting in one death the distribution of types of section was *benign tertian* 48 *subtertian* 29 and *cachexia* 1.

Two reports of suspected outbreaks of plague were received—one affecting the Southern Border and the other the middle of the Protectorate. On investigation both reports proved to be unfounded. It is gratifying to note that the people are fully alive to the bility and risks of plague infection and are ready to inform the rities without delay of their suspicions. In view of the fact that in 1935 plague had been prevalent in the Kuruman district Southern Border the Medical Officer and Rodent Officer were immediately despatched to the area to investigate the results of this investigation being embodied in a Report by Dr M GERBER and presented in an Appendix to the Report under review. It appeared a number of deaths of natives had occurred but on enquiry causes of death had no resemblance to plague infection. A rodent survey was carried out in large tracts of country showing signs of definite rodent with here and there small areas showing active and healthy mortalities. It was concluded that a few cases of plague may have occurred sporadically in that part of the country.

Two cases of *alastrim* among natives were seen in Francistown. Two outbreaks of *cerebrospinal meningitis* occurred during the year in places about 200 miles apart. The Medical Officer in charge of No. 1 Travelling Dispensary arrived at Lebuthutu—where he was informed 19 deaths had taken place—towards the end of the outbreak there which gave rise to 27 cases with 20 deaths. The infection was believed to have been introduced from Kanye where 4 cases with 1 death had been seen by the Medical Missionary. Other suspected cases were only reported after death. Necessary precautions were taken to limit the spread of the disease in both areas affected. About the middle of the year a mild outbreak of *influenza* was responsible for 391 cases. Of the prevalence of *scurvy* it is impossible to speak with any degree of certainty for the only cases known are those attending for dispensary or hospital treatment. During the year 41 in patients and 229 out patient cases were dealt with in the Protectorate as a whole. Serowe were also 6 out-patient cases of *pellagra* 26 of *beriberi* and 42 of *ricketts* while in-patients treated for these three causes were 2, 1 and

respectively. It is said that the good crops of 1936 reduced the incidence of diseases due to malnutrition but it is observed with regret that natives do not make good use of the green foodstuffs indigenous to the Protectorate.

*Enteric fever* is not mentioned. Classified returns show that among 7 in-patient cases of *dysentery* 13 were amoebic and 4 bacillary while among 247 out-patient cases 19 were amoebic, 156 were bacillary and in 72 cases the type of infection was not defined. Of the recorded cases 98 occurred at Molepolele and 60 at Mochudi.

*Of tuberculosis* (all forms) 435 cases were recorded and of these 332 were the *pulmonary* form of the disease. Once again it is pointed out that these figures refer only to cases seen by Medical Officers and that probably there are many more sufferers who never approach Europeans for treatment. The disease is said to have been introduced from the mines in the opinion of some Medical Officers natives who have worked in the mines for certain periods develop the disease in a quiescent form and that the disease flares up in these men on their return as the result of indifferent food, insanitary living conditions and other adverse factors. The spread of the disease is largely influenced by conditions within the Protectorate—frequent droughts, failure of crops, malnutrition, plus the ravages of such diseases as malaria, syphilis, and curvy. As the disease is of comparatively recent introduction the people have not yet acquired an inherited resistance to the infection and an increase in incidence is to be expected. It is noted that 3 090 cases of *affections of the respiratory system* were treated during the year among them being 1 443 cases of *bronchitis*, 677 of *pulmonary spirochaetosis*, 82 of *broncho-pneumonia* and 43 of *pneumonia*.

Towards the end of the year an outbreak of *rabies* was reported in Ngamiland, the disease having made its appearance in the Mochimo District just south of Angola, resulting in several natives being bitten by rabid dogs. The disease spread southwards towards Nakaneng, and more natives were bitten altogether 25 cases with 2 deaths were recorded. All persons bitten were treated with anti-rabic vaccine and the Veterinary Department took immediate steps to control the outbreak by the destruction of dogs within five miles of any reported case of rabies and by the end of the year over 2 000 dogs had been destroyed north of Nakaneng and the whole of the Batawana Reserve was also placed in quarantine. Mr J HODGKINSON, Chief Veterinary Officer, describes the steps taken in an Appendix to the Annual Report.

Nine new cases of *leprosy* presented themselves for treatment during the year, eight of these being seen by the Medical Missionary, Maim Ngamiland. Rumour speaks of many cases of the disease in the swampy areas of the Batawana Reserve in the north-west of the Protectorate, but as syphilis is rife amongst the Batawana people it is possible that some of the cases believed to be leprosy may be advanced cases of syphilis.

With regard to *helminthic diseases* the classified returns show one case of *ankylostomiasis*, 66 of *taeniasis*, 5 of *ascariasis* and 36 of *urinary schistosomiasis*. Incidence of the latter condition has declined considerably by comparison with 1935 experience (see this *Bulletin* 1937 Supp. p. 92\*). The majority of the cases again were from the Bakgatla Reserve and the remainder from Lobatse and Gaborone—probably

infected in the Bakgatla Reserve. With the extensive water developments at present taking place in the Protectorate increased number of dams etc. it will be necessary to introduce measures for the control of bilharzia.

*Veneral Diseases*—With the commissioning of the Travelling Dispensaries treatment for these and other diseases was made available for a large part of the population who formerly were unable to receive medical attention. During the year under review 5 572 cases of *syphilis* 622 of *gonorrhoea* 5 of *soft chancre* and 46 of *yaws* were treated. Every opportunity is taken of emphasizing the serious effects of these diseases upon the future welfare of the tribes and it is said a definite anti venereal complex is being developed as a result of these repeated efforts.

From among *other diseases* either referred to in the text or recorded among the classified returns the following have been selected for mention.

Several cases of *onyalos* were seen by the Medical Officer in the Francistown area. This interesting condition which occurs among the natives of Portuguese West Africa is not unknown in Southern Rhodesia but little appears to be known of the pathology of the disease. A widespread epidemic of *measles* amongst Europeans and natives occurred in the Lobatsi District with an unusually high percentage of adult cases only 22 cases are mentioned in the classified returns. Of *whooping cough* 268 cases were recorded 101 of these occurring in Serowe and 94 in Mochudi. Then there were also 4 cases of *relapsing fever* 551 of *rheumatism* 342 of the *organs of vision* 614 of *diarrhoea and enteritis* 1 094 of *affections of the skin and cellular tissues* while the 1 772 cases of *affections produced by external causes* included 442 cases of *wounds* by cutting or stabbing instruments.

*Financial*—For the year ending March 31st 1937 total expenditure on Medical Services is returned as £20 126 a sum which represents 12 per cent. of the total expenditure in the Protectorate during the same period.

### SWAZILAND (1936)

The Swaziland Protectorate is situated in British South Africa between the Drakensburg and Lebombo Mountains and is bounded on the north west and south by the Transvaal and on the east by Portuguese East Africa and Zululand. Its total area is 6 705 sq miles.

*Vital Statistics*—The total estimated population of 155,538 is distributed as to Europeans 2 735 natives 152 159 and other coloured population 644. The only records of births and deaths maintained relate to Europeans (see this *Bulletin* 1937 Supp. p. 92\*) but no details of these are supplied in the Report under review.

*European Officials resident* numbered 102 average number resident 88 one death recorded. There were 160 *Native Officials resident* with an average number resident of 158 in this group also one death occurred. The health of both European and Native Officials is reported to have been good.

*Maternity and Child Welfare Work*.—At the Raleigh Fitkin Memorial Hospital, Bremersdorp a Clinic functions under the auspices

of the British Red Cross Society and at this centre there were recorded 2,392 Child Welfare attendances, 1,044 ante-natal examinations, 112 deliveries and 3,102 attendances at lectures, also 258 pregnant women were examined and routine blood and other tests made. Similar activities characterize the daily out-patient work at all hospitals. Gastro-enteritis is said to be common among young children, but though after confinement mothers bring their babies to the hospitals for examination and advice they continue the pernicious habit of feeding their children from the day of birth on thin maize porridge, with evil effects. At the Mbabane Hospital, 59 normal labour cases were dealt with and 38 at the Hlatikulu Hospital, with no maternal deaths at either of these institutions.

*School Hygiene*—In all districts a high incidence of dental caries among European children is reported, as there is no dentist in the Territory the children gradually lose their teeth. In the Southern District scabies and secondary anaemia associated with chronic malaria are common among European children, and the general health of these children is far from satisfactory. The native children at the Swazi National School are regularly visited by Government Medical Officers. Examinations of both European and Swazi children are to be undertaken and the results compared.

*Public Health Sanitation etc*—The state of the public health is said to have been generally satisfactory during 1936. The European towns or rather villages and the larger farms occupied by Europeans are the only places in which proper methods of *sewage disposal* are adopted—usually the bucket system in the towns and the pit latrine on the farms (see this *Bulletin* 1937 Supp. p. 83\*). *Water supplies* to most townships are unsatisfactory. Bremersdorp is the only place having a proper supply and a filtration plant which functions successfully. The Mbabane supply remains as described in these pages a year ago, the Stegi supply is very bad and always open to suspicion. Adequate supplies are now available to Hlatikulu. Supplies to Goedgegun demand urgent attention, for in this area water borne diseases are commoner than in any other township in the Territory.

Though the *diet* of the Swazis contains too high a proportion of carbohydrates they are exceedingly averse to increasing the protein content of their food by slaughtering and eating any of their surplus stock of cattle despite the fact that grazing areas are seriously overstocked.

The Tin Mines and Public Works Department are the only large employers of *native labour* within the boundaries of the Territory, the health of these works is said to be very good with practically no sickness. *Housing and Town Planning* matters are attended to by the Village Advisory Boards, no new buildings may be erected without their approval.

*Recommendations for future work*—The most urgent need is for the improvement of water supplies, the incidence of water-borne diseases is unusually high in some areas, patients requiring medical treatment increase in numbers annually, yet little has been done along the lines of organized prevention of disease. Dr R. JAMISON discusses the advisability of recommending the establishment of a purely Sanitary Branch of the Medical Service in Swaziland.

*Hospitals Dispensaries etc*—The increase in the numbers of in-patients and out patients treated continues in-patient accommodation is severely taxed and is unable to meet demands (see this *Bulletin* 1937 Supp p 94\*) At the Mbabane Hospital with accommodation for 30 patients the average daily number was 54 and at one time there were over 80 patients in the hospital, the majority of them accommodated on the floor extensions are urgently necessary The extensions to the Hlatikulu Hospital were completed and brought into use even with the additional accommodation available the hospital is always full The record of the year's work at the various hospitals is given below —

Hospital	Admissions	Treated	Deaths	Out patients
Mbabane	954	991*	27	9,553
Hlatikulu	499	523	18	8,839
Raleigh Fitkin (Mission)	880	929	37	11,799

At the Raleigh Fitkin Memorial Hospital at Bremersdorp a special feature of the work is the *training of native nurses*. During the year under review 8 probationers had completed their first year of training and were examined by Dr H W DYKE Principal Medical Officer of Basutoland who reported most favourably on the results of the work observing among other things that the training has been thorough and that the candidates have been carefully grounded in the essentials of elementary nursing A valuable feature of the training is that it is essentially a practical one adapted to the needs of a rural area.

The two *Government Dispensaries* and three *Mission Dispensaries* previously mentioned (see this *Bulletin* 1937 Supp pp. 94\*-95\*) continued to function with success the numbers of patients dealt with at these centres being—Mankwana 4,685 Goedgedun 2,092 Endimgeni (Mission) 5,067 Stegi (Mission) 3,453 and Pigg's Peak (Mission) 3,578

Another *Medical Outpost* was established and brought into use thus raising the number of these centres to five another was built in a remote part of the country having a dense native population but for various reasons work could not be commenced before the end of the year under review These outposts have more than proved their practical utility frequent requests are received from natives for their establishment in outlying areas.

With regard to *morbidity experience* during the year it is stated that so far as *general diseases* are concerned these show little variation from year to year It is stated that diseases common in natives include scurvy gastritis scabies chronic urinary infections and chronic rheumatism, but on the other hand cancer gastric and duodenal ulcers diabetes etc. are rarely met with among these people. Specific diseases commented upon in the text of the Report include those mentioned hereafter

*Malaria* is the only mosquito or insect-borne disease of importance met with in the Territory at Government Hospitals 167 in patients were treated with 5 deaths and there were also 3 cases of *blackwater fever* 2 of which proved fatal. As the result of enquiry among medical



practitioners in the territory, it was concluded that the prophylactic use of quinine was the only feasible measure. The concentration of population in any area is not sufficiently great to justify anti larval measures and the financial resources of the country are inadequate to meet the cost of applying such measures to the whole of the malarial areas.

Ten cases of *enteric fever* were dealt with at Government Hospitals and among the 3 fatal cases 2 were Europeans. In the Central District 18 patients were admitted to the Raleigh Fitkin Memorial Hospital, Bremersdorp and 5 of these died. That there were no cases in the European townships in the Central District is attributed in part to the improved water supplies. Microscopic examination of blood smears from two native patients admitted to the Hlatikulu Hospital showed agranulo-cytosis. The course of the disease proved similar to that of enteric fever and it would appear necessary to include this condition by examination of blood smears in all cases of suspected enteric or unspecified pyrexia. Both these patients died. *Dysentery* was responsible for 26 cases and 2 deaths. *Amoebic dysentery* is believed to be more common than hospital figures suggest—21 amoebic, 5 bacillary—and repeated microscopic examination has proved that many cases of mild chronic diarrhoea are really cases of amoebic dysentery. The practice now adopted is to treat every case of chronic diarrhoea not yielding to ordinary treatment with a course of emetine (see this *Bulletin* 1937 Supp. p. 95\*).

There is no *plague cholera typhus* or *yellow fever* in the country. A *smallpox* scare gave rise to some anxiety though later the alarm proved false. An extensive vaccination campaign was however undertaken and over 47 000 people were vaccinated.

The position with regard to *tuberculosis* is described as "very unsatisfactory" for though reliable facts are lacking the general belief prevails that the disease is steadily increasing. At Government Hospitals 72 patients were treated with 10 deaths. 39 of the cases and 6 of the deaths being due to the *pulmonary* form of the disease. Hospitals are too crowded to accommodate patients suffering from tuberculosis for the long periods necessary to effect cure and even if a tuberculous sanatorium were established it might be difficult to persuade patients to remain as inmates over extended periods of time for natives are inclined to dispense with institutional treatment on the appearance of signs of improvement. The problem is beyond the resources of the Medical Service, insoluble under present conditions, and unlikely to improve until better living conditions and more liberal and varied dietaries are available. *Bronchitis* and *pneumonia* are said to be fairly common.

*Helminthic Diseases*.—In Bremersdorp the control of *schistosomiasis* has been made effective by adequate supplies of filtered water. Heavy *bilharzia* infections are reported among both European and native children in the Goedgegum area, where water supplies are suspect. Chronic urinary infections are often the after effects of *schistosomiasis*. *Tarniasis* is said to be very common, the meat of the kraal pig being the almost universal source of infection.

There is no evidence that *leprosy* is increasing. To the small Leper Settlement in the Mankasana sub-district (see this *Bulletin* 1937 Supp. p. 96\*) 15 lepers were admitted 5 were discharged and at the

end of the year there were 17 inmates. Results of treatment are said to be excellent and attributed largely to the liberal diets provided for patients.

*Veneral Diseases*—Despite all efforts made at the eight treatment centres in the territory no reduction in the numbers of cases treated is so far manifest. It is believed that easier means of communication have contributed largely to the spread of infections. Native women who have contracted the disease at some time undergo treatment to cure it is realized that these infections are the cause of sterility a condition universally regarded by these women as a reproach. At Government Hospitals 147 cases of *syphilis* and 19 of *gonorrhoea* were dealt with as in patients but neither hospital nor dispensary returns are any measure of actual incidence of venereal diseases.

Among other diseases mentioned in the Report the following are included. *Chronic rheumatism* is common among natives and probably due to insufficient protection against rapid weather changes especially in the highlands along the western border. *Diphtheria* is rare one native child was admitted to the Hlatikula Hospital but too late to benefit from anti toxin treatment. A widespread epidemic of *whooping cough* occurred among the children in the Southern District with low mortality and a few cases of *measles* were reported from the Central District. Eighteen cases of *anthrax* were dealt with in hospitals with 1 death all were contracted through the skinning and cutting up of animals which had died from the disease.

*Scientific*—Under this heading mention can be made of the 1,500 specimens submitted to the Institute for Medical Research Johannesburg for examination and report. A number were blood films faecal specimens etc. but the large majority were for Wassermann tests for pregnant native women who have had or think they have had *syphilis* (see above *venereal diseases*).

*Financial*—Total expenditure on Medical and Sanitary Services amounted to £16,557 a sum representing 15.7 per cent. of the total revenue of the territory during the year under review.

### SAINT HELENA (1936)

The Colony of St. Helena consists of the Island of St. Helena (47 sq. miles in area) and its dependency the Island of Ascension (34 sq. miles in area). St. Helena lies in the South Atlantic in lat. 15°55' S and long. 50°42' W and is about 4,210 miles from Plymouth and 1,700 miles from Cape Town. Ascension lies about 700 miles north-west of St. Helena.

*Introductory*—The Report under review comprises a mimeographed document of four pages only. The reader is referred to the summaries appearing in these pages a year ago.

*Vital Statistics*—The Island population was estimated to number 4,341.

Registered births numbered 134 and deaths 86 the resulting crude annual birth and death rates being 30.8 and 15.2 per 1,000 respectively. The infant mortality rate was 120 per 1,000 births (see this *Bulletin* 1937 Supp. p. 97\*).

The number of *European Officials* resident is omitted from the Report but it states that none was invalided or died during the year.

*Maternity and Child Welfare Work.*—Under this heading the following comment is recorded: "The local midwives are fairly satisfactory only one case of post-puerperal sepsis occurred during the year."

*Public Health Sanitation etc.*—On the whole the health of the Colony during 1936 was said to have been satisfactory. *Water supplies* methods of *sewage disposal* etc. remain as previously described. *Housing conditions* in many houses both in town and country are described as appalling and no new houses are available. It is curious to note that the Senior Medical Officer has no power to declare a house unfit for human habitation nor has he rights of entry to any mill bakery slaughterhouse etc. Only the Health Inspector has powers of entry and he has no health training. Still further though the Senior Medical Officer is Chairman of the Board of Health, the only person who has the right of entry to any premises is the Sanitary Inspector. An Ordinance should be enacted to dispose of these anomalies.

*Port Health Work* continues to function along the lines previously described.

*Hospitals Dispensaries etc.*—Existing facilities remain as described in the last issue of this Supplement. *In-patients* at the Civil Hospital, Jamestown numbered 177 there were 10 hospital deaths and *out-patient* attendances totalled 5,544. At the Outdoor Dispensaries at Rutt's Gate and Sandy Bay attendances were 1,283 and 610 respectively while in addition Medical Officers conduct daily dispensaries at their private houses. A small outbreak of *diphtheria* occurred in the early months of the year. 4 cases of the disease are mentioned with 2 deaths. Concurrent with diphtheria appeared an outbreak of severe *septic tonsillitis* there was also an outbreak of *influenza* with two deaths. The number of cases of tonsillitis and influenza dealt with are not mentioned. From the reference to *amoebic dysentery* which appeared in the 1935 Report (see this *Bulletin* 1937 Supp. p. 96\*) the inference seemed to be that the disease was strange to Island experience but in the Report under review it is stated "the only tropical disease endemic on the Island is amoebic dysentery." For the rest it is said that *chickenpox* occurs in a very mild form that *ascariasis* is very prevalent, and that "venereal diseases are treated at the outdoor dispensaries" no figures of incidence are supplied.

The Prison was in good order and the health of the prisoners satisfactory. On the other hand the *Lunatic Asylum* is described as "a lamentable institution" under the control of a St. Helenian and his wife who have had no training for the work. At present the Asylum is administered by the Poor Relief Board but it is recommended that it should be taken over by Government, rebuilt and placed in charge of a matron trained in the treatment of mental cases.

*Financial.*—Expenditure on Medical and Sanitary Services amounted to £2,628, a sum which represented 13 per cent. of the total revenue of the Colony during 1936.

## NORTH AFRICA

## SUDAN (1936)

The Sudan is bounded on the north by Egypt, east by the Red Sea Eritrea and Abyssinia, south by the Uganda Protectorate and Belgian Congo west by French Equatorial Africa. Its western and northern frontiers meet in the Libyan desert. The greatest length north to south is approximately 1 300 miles and from east to west 1 200 miles. Its total area is about 1 008 100 sq miles.

*Vital Statistics*—For previous observations under this heading the reader is referred to this *Bulletin* 1936 Supp. pp 90\*-92\* and 1937 Supp. p 100\*-101\*. Population figures are to be regarded as only rough estimates and as such are of very limited value in the determination of birth and death rates. The distribution of these estimated populations reads as follows —

Province.	Approximate Population	Province	Approximate Population
Blue Nile	809 599	Kordofan	1,222,729
Darfur	751 528	Northern	508 030
Equatorial	1 051 059	Upper Nile	536 647
Kassala	409 355	White Nile	388,347
Khartoum	267 183	Total	5,944 477

At present no machinery exists whereby accurate vital statistics can be assembled, but the Report presents data for Khartoum and Blue Nile Provinces Berber Blue Nile Dongola and Wadi Halfa Districts births stillbirths and deaths with distinction as to sex and deaths in age groups. Summarizing these facts we have —

Nationality	Births	Stillbirths	Deaths
Europeans	29	1	29
Sudanese	18 525	489	10 508
Egyptians and Syrians	267	7	57
Others	351	3	439
Totals	19 169	500	11 031

The following facts are also given for *non-Europeans* —

Area	Births	Birth Rate	Stillbirths	Still birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Khartoum Prov..	4,223	15.8	118	27.9	2,650	9.9	265	62.7
Berber Dist.	3,837	20.3	116	30.2	1,925	10.2	205	53.4
Dongola Dist.	5,024	29.2	156	31.0	2,650	13.2	232	46.1
Blue Nile Dist.	4 806	11.6	81	16.8	3,253	7.8	164	34.1
Wadi Halfa Dist....	1,253	18.9	28	22.3	624	9.4	73	59.2

[It is presumed the stillbirth rates are calculated per 1 000 live births. With reference to birth and death rates see this *Bulletin* 1937 Supp. p 101\*]

*Government Officials* of British nationality numbered 820 two were invalided and two died during the year. Other Government Officials employed were *Sudanese* 3,836 with 4 invalidings and 14 deaths, *Egyptians* 537 2 invalidings, 4 deaths. *Syrians* 49 no invalidings or deaths.

The average annual strength of the *Sudan Defence Force* was 4 440. During the year 3,669 N.C.O.s and men were admitted to hospitals suffering from various forms of disease. *Malaria* headed the list with 977 cases—most of these occurring among troops operating in unhealthy areas along the eastern boundary. *Wounds and injuries* follow next in order with 708 cases attributable to extensive movements of troops and increasing mechanization of equipment. *Veneral diseases* were responsible for 508 cases of which 278 were due to gonorrhoea, 188 to syphilis and 40 to soft chancre.

*Maternity and Child Welfare Work*—Valuable work highly appreciated by all classes of the population continues to be carried out at established clinics (see this *Bulletin* 1937 Supp. p. 101\*). It is noted that of the 9,085 attendances recorded at clinics in Khartoum Province 2,928 related to new cases. The returns of the Civil and C.M.S. hospitals, the Medical Training School, and trained midwives in Omdurman (from the latter source data for the first half of the year only) show that 1 109 women were treated for diseases of pregnancy childbirth etc. and 11 died, and of 1 018 births recorded 877 were live births. Hospital returns also show that 646 gynaecological and 446 labour cases were dealt with, 642 of the former and 425 of the latter relating to non-European women among the 425 native labour cases 22 deaths were registered.

At the *School of Midwifery* Omdurman, 25 pupil midwives completed their training and passed the qualifying examination, while 5 trained midwives attended revision courses. Of the 269 midwives trained at this School during the past 16 years, 224 are still in practice in various parts of the Sudan their inspection is carried out regularly by the Inspectress and Matron of the School. So successful has the work proved that there is an increasing demand on the part of Sudanese women to be delivered in hospital or to be attended by a trained midwife. The stage has been reached when the work of the School is to be supplemented by the establishment of a subsidiary centre at Juba in the Southern Sudan.

*School Hygiene*—It was found possible to extend the work of the School Medical Service in most provinces of the Northern Sudan more attention was also paid to village schools especially with a view to the earlier treatment of trachoma and other eye conditions. During the year 21 041 children were examined *trachoma* remains the major cause of disability in the North and *malaria* in the South. No case of *pulmonary tuberculosis* was discovered. A year ago in these pages it was noted that the percentages of children affected by *trachoma* varied between wide limits not only as between Province and Province but even between Districts in the same Province. These variations continue the lowest recorded percentage is of 1.8 for a school in Khartoum Province and the highest 91.3 for one in White Nile Province. In Khartoum Province out of 2,814 children examined, 1 055 were suffering from trachoma and among 1,250 pupils there were 233 cases of defective vision. Routine treatment of trachoma has

proved most effective. Incidence of the disease among pupils of the Gordon Memorial College declined further to 21·7 per cent. (see this *Bulletin* 1937 Supp p 102\*) As regards malaria incidence among school-children spleen rates—which are given for various Districts in the nine Provinces—range from 0·7 per cent. in Wadi Halfa in the Northern Province to 47·2 per cent. at Fung in the Blue Nile Province. It is pointed out that while in the Northern Sudan the figures provide fairly accurate indices of malaria endemicity in the Southern Provinces where schools are few the data may prove misleading.

*Public Health Sanitation etc*—The epidemic of *cerebrospinal meningitis* which continued from 1935 and spread to every Province in the Northern and Western Sudan adversely affected the state of the public health during the year under review. Moreover in the Northern Sudan the rains were heavy late and badly spaced and these together with the irregular fall of the Nile and formation of residual pools provided conditions favourable to mosquito breeding with the result that malaria incidence was considerably higher. Though these developments heavily taxed the resources of the public health staff the *Sanitary Services* were nevertheless extended and consolidated in towns and in most Provinces. In Dongola good progress was made in the provision of properly constructed *pu latrines* in private houses while in the smaller towns with the appointment of qualified sanitary overseers health organizations were established where hitherto sanitation was perfunctory or absent.

Though no new purification plants or piped *water supplies* were installed during the year projected schemes for Wadi Halfa, Malakal, and Torit are being considered. The routine examination of established supplies continued to give satisfactory results (see this *Bulletin* 1937, Supp p 102\*).

The question of *housing improvement* received special attention for the epidemic of *cerebrospinal meningitis* again emphasized the importance of overcrowding as the main factor in the spread of the disease. In the Northern Sudan steady progress is reported in the clearing of insanitary and overcrowded areas and the construction of an improved type of dwelling. A committee was appointed to consider the best types of native houses from the economic and hygienic point of view.

The six *Sudanese Sanitary Officers* are proving a valuable addition to the public health service. It is intended to post at least one such officer to each province where British staff is not available. Sanitary Overseers (see above) undergo a course of instruction in Khartoum during the year 38 candidates qualified and were posted to various towns and districts.

*Training Medical etc*—To the Kitchener School of Medicine 10 new students were admitted and there are now 24 medical and 6 sanitary students on the registers. Six out of seven medical students were successful at the Final Examination and will be posted to the larger hospitals for one year on probation. In the course of training for Assistant Medical Officers—who in outlying districts where no sanitary staff are available are responsible for public health work—instruction is given in the principles of hygiene and sanitation.

*Port Health Quarantine etc*—Ships entering Port Sudan numbered 1 604. None was quarantined but 3 persons from ships were isolated.

during the year. Quarantine restrictions for cholera were enforced at times during the year against ships arriving from Siam and Ceylon for smallpox against vessels from Bombay and Karachi, and for plague against ships from Karachi. The *Suakin Quarantine Station* dealt with 3 404 pilgrims: all were vaccinated and received one inoculation against cholera. 151 were admitted to hospital and 7 died. At Wadi Halfa 1 152 Egyptian labourers passed through the quarantine: none were repatriated as unfit though 68 were found to be infected with bilharzia and were treated.

All aircraft arriving at or departing from frontier aerodromes are inspected and disinfected during the year 2 371 machines were dealt with at five aerodromes. All mosquitoes captured are identified by the Medical Entomologist and a record kept of their probable port of origin.

*Hospitals, Dispensaries, etc.*—With the completion of the new Omdurman Hospital it is believed that hospital facilities—providing approximately one bed per 1 000 population—will be as adequate as can be supervised and maintained efficiently. Future aims will be directed towards the provision of X ray sets, better laboratory equipment etc. and to raising the standards of efficiency of the subordinate staff. There are now 337 dispensaries established in various parts of the Sudan: no appreciable increase in their number is envisaged in the near future.

There appear to be 6 *Mission Hospitals* of which 4 are maintained by the Church Missionary Society, one by the Sudan United Mission and one by the American Mission. Of *Mission Dispensaries* there are 12 viz. Sudan United Mission 6, Italian Mission 3, American Mission 2, and Church Missionary Society 1. Work accomplished at Government and Mission treatment centres during the year may be set out as follows:—

Item	In-patients	Deaths	Out-patients
40 Government Hospitals, and 337 Government Dispensaries	96,081	2,306*	6,500 411
4 Mission Hospitals	1,990	7	113 454
12 Mission Dispensaries	—	—	50,194†

95 629 of the in-patients and 2 294 of the deaths relate to non-Europeans

† Data are supplied for two Dispensaries only

*Courses of training* are organized for Assistant Medical Officers, Dispensers, Hospital Orderlies, Hospital Nurses, and other categories of medical and sanitary personnel (see also *Training Medical, etc. above*).

The notes which follow briefly summarize the more important items of 1936 morbidity experience commented upon in the Report under review:—

*Malaria* remains the most important public health problem with which the Sudan authorities have to deal, for though the disastrous epidemics of past experience no longer sweep the country, much disability and loss of life are still attributable to the disease. Mention has already been made of the factors responsible for considerably increased incidence experienced during the year. In certain parts of

the Northern Province the disease assumed almost epidemic proportions but it is observed that in the Southern half of the Province where sanitary services have recently been reorganized and strengthened there was no epidemic malaria despite adverse climatic conditions.

According to official returns at Government institutions 189 713 cases of the disease were dealt with and of this total 10,310 of the patients received inpatient hospital treatment and 74 died. Of *blackwater fever* 38 cases were reported with 14 deaths the racial distribution being Arab Sudanese 24 cases, 11 deaths Negroid Sudanese one non fatal case British 3 cases 1 death other races 10 cases, 2 deaths.

The distribution of spleen rates among school-children is briefly referred to in the Section *School Hygiene* above. It remains to add that *subtertian* malaria appears to be the prevailing infection. In the Blue Nile Province blood films examined for the presence of malaria parasites contained 1 790 *P. falciparum* 194 *P. vivax* and 65 *P. malariae* while at the Stack Medical Research Laboratories in 1 006 blood films examined the corresponding findings were 133 41 and 2 respectively.

Anti-malarial work is being extended but outside the towns little can be done in this direction owing to the prohibitive cost of effective measures. In these circumstances protection of the individual both in urban and rural areas is aimed at as the principal measure of defence (see also under *Scientific* below).

The epidemic of *cerebrospinal meningitis* (see *Public Health* above and this *Bulletin* 1936 Supp. p. 96\* and 1937 p. 104\*) continued to rage with increased severity. During the year under review 13 440 cases and 8,906 deaths were recorded or four times the number of cases and deaths recorded in the preceding year. morbidity and mortality due to this disease were greater than any experienced during the past seven years. All provinces were affected—Darfur Province had 8,833 cases and 6 158 deaths Kordofan Province 2,293 cases and 1,886 deaths while at the other end of the scale were Port Sudan and Suakin 3 cases 2 deaths and the Equatorial Province one fatal case only.

Despite every effort to localize the epidemic the disease spread rapidly during the first six months of the year finally dying away with the beginning of the rains. The only effective prophylactic measure under field conditions was the evacuation of villages to specially constructed shelters in the open country—where possible a separate shelter was constructed for each person (see this *Bulletin* 1936 Supp. p. 96\* and 1937 Supp. p. 104\*). No curative measures that are possible on a large scale have yet been evolved—anti-meningococcal serum was used in a number of cases but results were not encouraging.

At the Stack Medical Research Laboratories local strains of meningococci were isolated and examined with results that were confusing. It is stated that "In view of this antigenic overlapping it seems distinctly unlikely that the group sera at present issued from the Standard Laboratory are likely to afford any help in an antigenic classification of strains in the Sudan or act as a guide to specific serotherapy" and again "there has been no clear evidence that the polyvalent serum used in a number of cases in 1936 had any specific influence on the infection." [In the 1935 Report mention



was made of experiments being conducted by Dr N. L. CORKILL with Vitamin A extract as a prophylactic results were said to justify further experiment (see this *Bulletin* 1937 Supp. pp 104\*-105\*) but no mention of these researches appears in the Report under review.]

*Smallpox* introduced by Abyssinian refugees into the southern districts of the Blue Nile Province gave rise to 501 reported cases and 132 deaths. An outbreak of chickenpox in the area at the same time may have made differential diagnosis difficult in many cases. A small outbreak in a hill district of Kassala Province caused 31 non-fatal cases a mild form of the disease made its appearance in two districts in the Equatorial Province resulting in 43 non-fatal cases and there were also two cases among pilgrims in the Suakim Quarantine Camp one of which proved fatal. During the year 82,272 primary and 10,677 re-vaccinations were performed.

Of *diphtheria* 63 cases were reported, 34 of these occurring in the Northern Province where the disease has persisted for some years among a sparse and scattered population south of Wadi Halfa. All the cases received in-patient hospital treatment and 12 died. Among 739 throat swabs examined at the Stack Laboratories 46 were positive with *C. diphtheriae*. Twenty-two non-fatal cases of *relapsing fever* occurred in the Singa District of the Blue Nile Province and a mild form of *influenza* appeared in epidemic form during the winter in the Northern Sudan. *Undulant fever* was responsible for 58 cases and 4 deaths, 15 of the cases occurring in the Blue Nile Province 14 in the Equatorial and 12 in Kassala Province. At the Laboratory 48 out of 646 samples of serum agglutinated *Br. melitensis*.

The incidence of *rabies* remains high. Hospital Returns show that 64 persons (two were Europeans) received treatment as in-patients and 8 died, while 373 persons received anti-rabic treatment during the year. In one case treatment was commenced 4 days after the bite a full course of injections was given yet hydrophobia developed on the 85th and the patient died the next day. At the Stack Laboratories among 115 brains received for examination 42 were positive for *Negri bodies* 34 being dogs, 6 donkeys, 1 cat 1 sheep and 1 rabbit (inoculated from a human case).

*Kala-azar* is mildly endemic in an extensive belt of country adjoining the Abyssinian and Eritrean frontiers. Incidence of the disease remains fairly constant. During the year 214 cases and 28 deaths were reported, the main centres of distribution being 111 cases in Blue Nile Province 52 in the Equatorial Province and 21 in Kassala Province. Of the total cases recorded 106 occurred among Arab Sudanese and 91 among Negro Sudanese. All cases received in-patient hospital treatment.

*Enteric fever* gave rise to 135 cases with 17 deaths. 133 of the cases were hospital in-patients and 17 died (6 European cases 1 death). As usual the majority of the cases were due to *Bact. typhosum* infections. Sanitary improvements in the town of Dongola have proved successful in bringing about a decrease in incidence of the disease, and in Khartoum Province the number of notifications was fewer than in any year since 1932. At the Stack Laboratories Widal tests were applied to 646 samples of serum and 90 reacted positively with *Bact. typhosum* diagnosis by blood cultures in 434 samples examined gave

59 *Bact typhosum* 4 *Bact paratyphosum A* and 1 *Bact paratyphosum B* while in 711 specimens examined *Bact typhosum* was isolated in 45 cases. A certain amount of work was carried out on the Vi antigen of *Bact typhosum* and the results published in the *Journal of Hygiene* Vol. 36 p 368. The inagglutinable strain isolated from a child (see this *Bulletin* 1937 Supp p 106\*) was proved to be a typical V with a high virulence for rats and gerbils.

The incidence of *dysentery* is said to be declining and with further sanitary improvements it is hoped this decline will continue. During the year among 2,564 hospital cases 2,393 were amoebic and 171 bacillary infections. 55 deaths were ascribed to amoebic and 6 to bacillary dysentery. Among the hospital cases were 17 European patients of which 14 were suffering from the amoebic form of the disease. At the Stack Laboratories where 1,390 faecal specimens were examined the types of organisms isolated were *Bact dysenteriae* (Flexner) 24 Shiga 19 Schmitz 9 and Sonne 2.

During the year 150 new cases of *sleeping sickness* were reported all occurred in two areas in the Equatorial Province close to the frontier. Easy intercommunication with infected areas across the frontier and the local topography which is ideal for tsetse-fly breeding add to the difficulties of dealing with the problem in the endemic areas. All possible precautionary measures are taken the pass system for travellers to and from Uganda functions satisfactorily (see this *Bulletin* 1937 Supp p 106\*). The Government Entomologist reports the receipt of a specimen of *Glossina morsitans* from an area in the Nuba Mountains whence no fly has been recorded for many years.

*Tuberculosis*—Of the 868 cases admitted to hospitals 519 were of the *pulmonary* form of the disease. out of 141 deaths recorded 117 were ascribed to *phthisis*. Of the total cases recorded 764 occurred in the Northern and 104 in the Southern Sudan. only 7 cases occurred among Europeans. 6 of these being due to pulmonary tuberculosis.

*Eye diseases*—Dr A. R. McKELVIE contributes his usual *Ophthalmic Report*. According to Hospital Returns 268 015 in and out-patients were treated for *trachoma* during the year under review at the River Hospital 565 in patients were treated for this affection, and there were also 23,318 attendances recorded among out-patient cases the corresponding figures at the Omdurman Hospital being 90 and 32,367 respectively (see also *School Hygiene* above).

*Helminthic diseases*—Hospital Returns provide the following data relating to these infections —

	In-patients	In-patients and Out-patients
Schistosomiasis	1 148	10,858
Dracontiasis	647	3 716
Ankylostomiasis	572	2,947

As regards *schistosomiasis* it is observed that during the past 12 years measures have been directed towards the prevention of infection of the canals and indigenous population in the irrigated area of the

Genra, a district exposed to the constant risk of infection from the thousands of immigrants who enter a large percentage of them suffering from the disease. To date these measures have proved successful. The annual surveys in parts of the Northern and Blue Nile Provinces gave the following results —

Area	Number Examined	Number Infected	Percentage
Northern Province (2 Districts)	37,334	1,366	3.4
Wadi Halfa District	12,437	1,439	12.9
Blue Nile Province	23,067	27	0.09

*Draconilaris* continues as a cause of considerable disability in the Southern Sudan and in the Nuba Mountains. In the former area special wells are being constructed to reduce the incidence but in the Nuba Mountains the situation is more difficult owing to the existence of numerous infected pools in the hills. It is noted that of 3,716 cases treated in all areas during the year 3,225 were in the Equatorial Province. *Ankylostomiasis* is said to occur only in a few isolated areas in the Northern Sudan, and that measures taken to prevent the introduction of infection have reduced incidence to negligible proportions. In the Equatorial Province the disease is widely distributed on the Western side of the White Nile but is rarely met with on the east of that river.

*Leprosy* is believed to be well under control throughout the Sudan where it is estimated there are 10,493 lepers with 7,933 of them in the Equatorial Province alone. At the end of the year there were 2,550 lepers in camps or settlements and 899 under observation or treatment. The system of home isolation at present carried out in the Northern Sudan is said to work well while in the Southern Sudan where the incidence is higher settlements have been established near dispensaries and have functioned satisfactorily. It is only in the southern districts of the Equatorial Province that leprosy is a menace, and there both the large and small settlements function as satisfactorily as can be expected.

Extracts are again given from the Report of Dr. WOODMAN Senior Medical Inspector, Li Rangu (where one of the big leper settlements is established) in the Yambio District. Among other matters he states that there are 3,648 known lepers in the Yambio sub-district and approximately 850 in the Merdi and Iba sub-districts, and that the conclusions reached and described in the preceding report still hold good (see this *Bulletin* 1937 Supp. p. 107\*). From among relapsed cases, and those having persistently declined in spite of previous treatment, selected groups have been given experimental courses of treatment with various dyes so far without evidence of permanent benefit from their use.

Of several diseases it is stated that little change in their incidence can be reported. The investigations of the Obstetric Surgeon continue and show that the incidence of *syphilis* among pregnant women though high is not a common cause of abortion. Among 40 cases of abortion, 39 were Kahn tested and only 5 or 13 per cent. reacted

positively [It is regretted that in the preceding issue of this Supplement it was stated in error that 94 per cent. of tested cases reacted positively in 1835 actually the proportion was 9.4 per cent.] During the year Port Sudan was notified internationally as a port at which sailors could obtain free V.D. treatment in accordance with the terms of the Brussels Convention. The incidence of yaws is said to have been reduced to negligible proportions except in the extreme south.

The Report under review which states that 77,571 cases of syphilis and yaws were treated during the year also contains the following —

Disease	Hospital In patients		Sudan Defence Force N.C.O.s and Men.
	Europeans	Non Europeans	
Syphilis	—	11 157	188
Gonorrhoea	1	2,285	278
Soft Sore	2	495	42
Yaws	—	944	2

Other diseases include mention of 89 cases of scurvy with 2 deaths 7 of beriberi and 3 of pellagra. Dr H. A. CROUCH reports that there is reason to believe that in many areas the population exist in a state of subnutrition. Tumours were responsible for 758 cases of which 192 were malignant and the cause of 42 deaths. At the Stack Laboratories among 140 neoplasms received 104 were defined as malignant tumours. Any attempt to analyse details with distinction as to age and sex would be misleading—in most cases age is not given and fewer women than men submit to operation for neoplasms. Hydatid disease which appears to be confined to the Taposon tribe round Kapoeta caused 10 cases while of acute rheumatism 288 cases and 5 deaths were reported with the greatest incidence in the Northern Kordofan Blue Nile Khartoum and Kassala Provinces.

Scientific—Under various headings in the preceding notes mention has been made of the various specimens received for examination at the Stack Medical Research Laboratories and of the findings recorded. It remains to say that during the year under review examinations of all kinds totalled 18 041 with among them a considerable increase in the number of routine Kahn tests (exclusive of those carried out at the Port Sudan Hospital Laboratory) i.e. 11 490 as compared with 9,320 in 1935. Tallqvist's method of haemoglobin estimation has been abandoned, the Sahli-Hellige Haemoglobinometer adopted and this apparatus issued to six of the large hospitals. The technique of the use of the latter instrument is now taught as a standard method to all assistants under training. The yellow fever investigations continue (see this Bulletin 1937 Supp. p. 109\*) the work including examination of liver sections from fatal cases of pyrexia of obscure origin mouse protection tests with sera collected from the natives of the Eluri district of the Nuba Mountains (results indicating a wide-spread infection of the virus of yellow fever in that area during the last 20 years) and similar tests with sera obtained from monkeys and cows. These investigations will be extended to include the sera of other domestic and wild animals. Other work included the preparation

of vaccines experiments carried out with strains of seed lymph received from Lagos and from the Government Lymph Institute, Colindale. These experiments and the results obtained are described in some detail.

The Government Entomologist contributes a separate report of the activities of his department. This included surveys of insects of medical importance the collection and identification of insects from aeroplanes, experimental work concerned with determining the efficacy of stocking pools with *Gambusia affinis* for the control of mosquitoes. Results, which are to be embodied in a paper for publication, suggest that this species of fish is not effective for the purpose in artificial pools in urban areas. A detailed account of a survey of anophelines in the Gezira Irrigated area is supplied. *A. gambiae* was found to greatly outnumber other species and is the only proved vector of malaria in the area. The Report concludes with reference to the use of larvicides methods of trapping adult mosquitoes, and the occurrence of mosquitoes other than anophelines.

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## MEDITERRANEAN

## PALESTINE (1936)

Palestine on the western edge of the continent of Asia at the eastern extremity of the Mediterranean Sea is bounded by the Mediterranean on the west Syria on the north Trans-Jordan on the east and the Egyptian Frontier District of Sinai on the south. It has a total area of about 10 100 sq miles (somewhat larger than that of Wales). The chief town and seat of government is Jerusalem other important towns are Gaza, Tel Aviv Acre Jaffa and Haifa, the last two being also the chief ports. Palestine is administered under a Mandate from the League of Nations.

*Vital Statistics*—Including the Bedu tribes as enumerated at the 1931 census the mid year population for 1936 was estimated to total 1,339 012 persons distributed as to 848,354 Moslems 370 475 Jews 108 964 Christians and 11,219 others. For the settled population only (excluding the Bedu tribes) the relevant facts may be classified as follows —

Community	Mid-Year Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R. per 1 000 births
Moslems	781 789	41 543	53.1	15 624	20.0	5 657	186.2
Jews	370 471	11 009	29.7	3,271	8.8	758	68.9
Christians	106 473	3 860	36.3	1,345	12.6	440	115.7
Others	11,219	572	51.0	225	20.1	74	129.4
Totals	1,269 952	56 993	44.9	20 465	16.1	6,929	121.6

Of the total deaths recorded 8 518 were certified as to cause of death by Medical Practitioners, and of these 22 per cent. were due to *respiratory affections* 26 per cent. to *diarrhoea and enteritis* and 9 per cent. to *infectious and parasitic diseases*.

*Maternity and Child Welfare Work*—To the Princess Mary Maternity Wards at the Government Hospital Jerusalem, 625 maternity cases were admitted 602 live babies were born and 5 maternal deaths were recorded. To the Haifa and Nablus Government Hospitals maternity cases admitted during the year were 184 and 56 respectively.

The appointment of two British Lady Medical Officers permitted the extension of gynaecological and ante-natal services especially amongst Moslem women. Such clinics are established at Jerusalem Jaffa Haifa Acre and Nablus and at these centres despite disturbed conditions the large attendances testify to the value of the services available.

The Medical Department conducts 32 *Infant Welfare Centres* in towns and villages—four new village centres being opened during the year under review. Voluntary Committees co-operate in association with five of the centres and in four others Municipalities participate in the cost of maintenance. Government contributes to the support of the maintenance of the infant welfare services conducted by the

Jewish Medical Organization. Summarizing the records of work relating to the various authorities conducting infant welfare services the following facts are of interest —

Supporting Organization	No. of Centres	Children Registered	Attendances Children	House Visits by Nurses
Government and Municipal	34	9,344	251,194	84,193
Hadassah Medical Organization	15	2,697	56,711	19,414
Jewish Federation of Labour	19	2,149	34,494	2,774
Women's International Zionist Local Committees	5	484	17,779	2,138
	4	1,082	77,820	7,867
<b>Totals</b>	<b>77</b>	<b>15,751</b>	<b>357,658</b>	<b>116,341</b>

The only *Midwife Training School* is established at the Government Hospital, Jerusalem (Princess Mary Maternity Wards). During the year 16 Midwives completed the course of training. Plans to establish training schools at the Nablus and Jaffa Hospitals had to be postponed for financial reasons. The supervision of practising midwives and the development of district maternity and infant welfare services is carried out by the Superintendents of Midwifery stationed at Jerusalem, Jaffa, Haifa, Nablus, Gaza, and Hebron.

*School Hygiene*—The appointment of additional medical officers and nurses not being approved the work was carried on as satisfactorily as possible with existing staff. The Government School Medical Service is responsible for 378 boys' schools, 56 girls' schools and 25 mixed schools having a student population of 46,688 distributed as to 35,532 boys and 11,156 girls. The routine examinations of new entrants continued to be carried out as previously described (see this *Bulletin* 1896 Supp. p. 103\* and 1897 Supp. p. 112\*). During the year 9,826 pupils attending town schools and 10,395 pupils attending village schools were medically examined when it was found that 41.6 per cent. of those in town schools and 55.6 per cent. in village schools were suffering from *trachoma*; while attendances for routine treatment of the disease by teachers and school nurses totalled no less than 1,858,250. The usual examination of school-children for presence of splenic enlargement was carried out 24,012 children attending town schools and 42,029 children in village schools being dealt with *spleen rates in the* former averaged 1.7 per cent. and in the latter 6.7 per cent. It is noted there are also 347 Jewish Schools having 50,621 children on the registers dealt with by the Jewish Medical Service, and 360 schools not provided for by Government or Jewish Medical Services and having 30,478 pupils on their books. During the year 23 lectures on hygiene, etc. were given by the Medical Officers to Teachers who recorded 206 attendances on such occasions. In the case of Girls' Schools the older girls receive training in mothercraft and infant welfare under the direction of the Superintendents of Midwifery and Infant Welfare Nurses.

*Public Health Sanitation etc.*—In spite of serious disturbances and general unrest which combined to hamper the work of the Medical Department, especially in rural areas where staffs were exposed to constant dangers services were well maintained, and the general health

of the population at large was remarkably satisfactory. It is reported that the standard of *household sanitation and drainage* in the main towns was well maintained latrine and bath installations in both Arab and Jewish quarters being of the most modern type. The completion of the intercepting *sewer* in the reconstructed port area of Jaffa is mentioned (see this *Bulletin* 1937 Supp p 113\*) but it is said that though in Jerusalem a decision to extend sewer connexions was reached, no great progress in the actual work can be recorded. The Consulting Engineers have in hand schemes applicable to Haifa, Jaffa and Tel Aviv. Despite all difficulties the work of installing *latrines* in villages—mainly in areas where the incidence of hookworm is high—was carried on practically without interruption. In 45 villages 4 708 latrines were installed. The Municipal Sanitary Services already overtaxed (see this *Bulletin* 1937 Supp p 113\*) were operated under exceptional difficulties owing to the civil disturbances. In the smaller towns *scavenging* was reasonably satisfactory though methods of disposal are primitive but in the villages this work makes but slow progress.

The new *water supply* for Jerusalem from Ras-el-Ain was brought into use (see this *Bulletin* 1937 Supp p 112\*) but as the softening and filtration plant was not completed purification was effected by chloramine added to the supply at the last pumping station before the reservoirs and the purity of the supply maintained at a high level throughout the year. Little advance is reported as regards other municipal supplies. The Consulting Engineers have reached no definite proposals with regard to additional supplies to Jaffa and Tel Aviv. Investigations continue in the matter of the Haifa supply. Though the programme for the improvement of existing *village water supplies* was considerably hampered a number of schemes have been completed and have provided comparatively adequate and pure supplies in areas where previously water was drawn under insanitary conditions.

Only a comparatively small programme of major schemes of *anti-malarial work* was possible during 1936 no new works were undertaken and activities were restricted to the improvement and completion of existing works which included those of Birket Ramadam, Rubin March, Tel-el Rish and Tiberias Lake Shore.

A scheme for the *housing of labourers* who live in shacks under appalling conditions in and around Haifa has been prepared and one similar for Jaffa. Work involved under the Public Health (*Rules as to Food*) Ordinance was to some extent disorganized by the prolonged strike when all Arab establishments were closed. Special attention was devoted to the inspection of milk and butter and of fish brought by the desert route from Baghdad. The inspection and licensing of premises was continued.

The Staff of the *Railway Medical Service* remained unchanged and continued to carry out routine work as in previous years. The housing programme (see this *Bulletin* 1937 Supp p 114\*) was almost completely stopped on account of political disturbances and little progress can be reported. Total attendances of railway personnel at the clinics of Medical Officers were 18 140 and of these 13,261 were new cases.

*Port Health Work*—Quarantine restrictions were imposed at various times against cholera for arrivals from India, Siam, and Ceylon.



plague for arrivals from Malta and India, and smallpox against arrivals from India. During the year 1,957 steamers and 551 sailing vessels entered the port of Haifa, 48,204 persons disembarked and were notified for surveillance, 22,008 of these being immigrants who were medically examined, etc. before being allowed to enter the country. The port of Jaffa was closed during practically the whole period of the Arab strike with the result that only 603 steamers and 273 sailing vessels entered. 8,845 persons disembarked and of these 4,523 were immigrants who were dealt with as at Haifa. Rat catching at the ports was continued but on examination none showed any signs of plague.

Of the total of 57,717 persons entering the country during the year and subjected to medical surveillance 85 per cent. were traced to their destinations. 784 Palestinians and Transjordanians made the pilgrimage to Mecca, returning pilgrims being subjected to medical surveillance in accordance with usual practice.

*Air traffic* becomes increasingly important. 462 aeroplanes landed at Gaza, 381 at Ramleh and 59 at Haifa. Concentration of traffic at Lydda airport will greatly simplify quarantine work of these services.

*Hospitals Dispensaries etc.*—New construction of buildings was entirely suspended. there was no advance in the work on the proposed new Mental Hospital (see this *Bulletin* 1937 Supp. p. 115\*) the provision of a Tuberculous Sanatorium Hospital (see this *Bulletin* 1937 Supp. p. 117\*) the expansion of Nabfus and Safad Hospitals and construction of the Ramleh Hospital the new Infectious Diseases Hospital at Jerusalem (see this *Bulletin* 1937 Supp. p. 114\*) or the Maternity Block at Jaffa. There was therefore no expansion of hospital bed accommodation to meet increasing needs the British section was especially overcrowded and the amount of surgical work both among in- and out-patients at Government Hospitals increased considerably owing to the admission of the large number of severe cases among Army and R A F personnel wounded during the political disturbances.

The record of work at all institutions during 1936 reads as follows:—

Description	Beds	Admissions					Deaths
		Muslims	Jews	Christians	Others	Total	
9 Government and Municipal Hospitals	844	7,724	8,452	2,409	129	18,814	1,266
4 Prison Wards	7*	1,003	142	70	13	1,228	1
29 Voluntary Hospitals	1,895	7,804	15,468	4,338	1,729	29,479	1,214

The accommodation at various hospitals is acutely inadequate and expansion is urgently necessary. The greatly augmented number of British troops and continued presence of ships of the Royal Navy for whom adequate military hospital accommodation was not arranged before August threw a considerable amount of extra work upon already over-taxed staffs and hospital accommodation.

Exclusive of ophthalmic and other special clinics there are 20 Government and Municipal *dispensaries and out-patient clinics* where during the year under review 139,963 new cases were treated, *eye*

diseases accounting for 7,556 and malaria for 1 158 of the total patients among whom 72 per cent. were Moslems and 17 per cent. Jews.

At the 41 voluntary dispensaries and clinics 625 248 new cases were dealt with over 80 per cent. of the patients were Jews and only 14 per cent. Moslems here again eye diseases with 106 762 cases were responsible for much disability while malaria was treated in 2 923 patients.

Voluntary village clinics dealt with 267,911 new cases the majority being Jewish patients viz 257,346 eye diseases accounted for 11 626 and malaria for 1 727 of the total cases.

The training of nurses was continued 53 first year 44 second year and 32 third year nurses succeeded in passing the respective grade examinations.

The two Government Mental Hospitals at Bethlehem were constantly full few new cases could be admitted, and there is a waiting list of some 179 cases. Admissions numbered 33 deaths 3 and at the end of the year there were 157 patients in these institutions. The Ezrath Nashin Hospital for Jewish paying cases admitted 24 patients two died and there were 58 in patients at the end of the year.

The special ophthalmic service the ophthalmic sections of the general clinics at Government hospitals and dispensaries and the Mobile Ophthalmic Unit continued to be actively employed throughout the year. The epidemic of acute conjunctivitis was of a milder type and attended with fewer complications (see this Bulletin 1936 Supp p 106\* and 1937 Supp p 115\*). New cases were very slightly fewer than in the preceding year viz 63 480 as compared with 64 745 an increase in the total of attendances for treatment was recorded. As regards eye conditions dealt with these included 43,954 cases of trachoma 5 346 of trachoma with corneal ulceration and 27 689 of acute conjunctivitis.

Reported cases of infectious diseases numbered 10,960 with 1 168 deaths measles accounted for 3 489 cases and 199 deaths and typhoid and paratyphoid fever for 1,318 cases with 146 deaths. The Report under review discusses at varying lengths the principal items of morbidity experience during 1936 summarized notes of some of the commentaries follow hereafter.

The incidence of malaria is said to have been low in rural and negligible in urban areas. Actually there was a slight increase in the number of cases of the disease treated at public dispensaries but taking into consideration the total number of patients treated for all causes of ill health the percentage of malaria patients was lower among 765,216 dispensary patients dealt with 4 081 were treated for malaria. There is no reference to the total of malaria patients treated in the various hospitals but 840 cases were notified and these involved 4 deaths one non fatal case of blackwater fever was recorded. Anti-malaria services in both urban and rural areas continued to be actively employed mainly on measures of a recurrent nature and on the maintenance of major works already completed (see above Public Health and this Bulletin 1937 Supp p 115\*). A favourable influence was the failure of the rains in late spring facilitating the drying-up of temporary collections of water and swampy ground before the commencement of the anopheline breeding season. The disturbed political situation rendered the regular supervision of mosquito breeding places

a matter of no little danger and difficulty yet a considerable amount of valuable work was successfully accomplished the anti-malaria statistics are supplied in great detail in a series of tables The examination of school-children for presence of splenic enlargement has already been briefly mentioned in the section *School Hygiene* above

At the Government Laboratory where 11,500 blood films were examined for the presence of malaria parasites 911 proved positive and of these 77.2 per cent were *benign tertian*, 21.9 per cent *subtertian* and 0.9 per cent *quartan* infections In the Entomological Division work during the year was confined to the routine identification and classification of insects of medical importance—mainly anophelines in their larval and adult stages.

No case of *smallpox* was reported Vaccinations in the villages were somewhat fewer during the summer owing to disturbed conditions 77,960 vaccinations were performed during the year The incidence of *cerebrospinal meningitis* declined by comparison with 1935 experience 107 cases with 52 deaths were recorded Cases of *acute poliomyelitis* continued to occur sporadically in small numbers, 21 cases and 5 deaths being ascribed to this cause Of *relapsing fever* 23 non-fatal cases occurred The incidence of *measles* showed little change with 3,489 cases and 199 deaths there were however fewer cases and deaths due to *diphtheria*—257 and 28 respectively while of *scarlet fever* 197 non-fatal cases were reported

*Typhus fever* was responsible for 280 cases and 2 deaths as compared with 55 cases with 3 deaths in the preceding year the increase being largely attributed to housing conditions and overcrowding following upon increased immigration At the Government Laboratory research work on the endemic typhus of Palestine was carried out during the summer months investigations confirm the view that the disease is not epidemic but murine typhus a conclusion supported by the mildness of cases and a low case-mortality rate

The incidence of *enteric fever* was about half that of 1935 of the 1,318 cases and 148 deaths recorded, 1,148 of the cases and 143 of the deaths were ascribed to typhoid and the remainder to paratyphoid fever No particular factor or group of factors can at present be held to have contributed to the decline—political disturbances restricted population movements in some areas yet the decline was as marked in areas where such restrictions were scarcely felt a shortage of green vegetables may have been a factor Some time must elapse before any definite conclusions can be reached

At the laboratory the agglutinin content of 21,645 samples of sera was evaluated among the positive reactions being 890 *Bact. typhosum*, 62 *Bact. paratyphosum A*, 152 *Bact. paratyphosum B* and 10 *Bact. paratyphosum C* From 5,120 blood samples received for blood culture *Bact. typhosum* was recovered 252 times, *Bact. paratyphosum A* 25 times and *B* 28 times Enquiry into the prophylactic power of anti-enterica vaccines containing appreciable quantities of Vi antigen was continued results seem to establish that no mutual relation existed between the type of vaccine used and the titre of Vi agglutinin evoked

Bearing in mind that notification of *Dysentery* is still incomplete, it is said that during 1935 the disease was not unusually prevalent that 585 cases were reported and 39 deaths were ascribed to this cause.

At the Laboratory findings resulting from the microscopical examination of 20,321 faecal specimens included *E. histolytica* (free) 279 *E. histolytica* (cysts) 359 while resulting from 9 780 cultural examinations *Bact. dysenteriae* Flexner Y was isolated 449 times Shiga 100 times Strong 86 Schmitz 63 and *Bact. dysenteriae* Sonne 28 times.

*Tuberculosis*—Little was done during 1935 to relieve the existing situation palliative treatment only was possible except in a few cases for the State tuberculosis service envisaged was not sanctioned (see this *Bulletin* 1937 Supp pp 116\*–117\*) Apart from the 4 592 cases discovered during the course of the survey (mentioned in these pages a year ago) it is stated that during the year 438 cases and 201 deaths were reported. In another section of the Report 786 cases and 185 deaths are classified and of these 397 and 141 deaths occurred in towns and the remainder in the villages among them 351 of the town cases and 118 of the deaths were ascribed to the *pulmonary* form of the disease the corresponding figures for the villages being 327 and 35 respectively.

At the Government Clinics established for the treatment of tuberculosis 514 cases were on the registers but as the Jewish Tuberculosis League caters for the Jewish section of the population these figures are mainly representative of the Arab community the Jewish League recorded 2,233 cases Among 4 674 specimens of sputum examined microscopically at the Government Laboratory 542 were found to contain *Mycobacterium tuberculosis*.

Notification of *pneumonia* is still incomplete during the year 531 cases and 386 deaths were reported.

*Helminthiasis*—In the orange growing areas *hookworm* continued to be prevalent (see this *Bulletin* 1937 Supp p 117\*) The re-survey of the Jaffa district though hampered and disturbed by political conditions was continued and 2 968 examinations were carried out the percentage incidence among the untreated was 32.4 and among those previously treated only 7.8 per cent Though village sanitation was continued satisfactorily it was found impossible to inaugurate the Department's scheme for the sanitation of the orange groves though it is hoped this work will be undertaken in 1937 An investigation into the incidence of *schistosomiasis* in the Auja River Basin (Jaffa District) was commenced but available figures are too small to be of value at present 64 cases of the disease (*S. haematobium*) were investigated in this area. The majority gave a history of having bathed in the Auja River though the molluscan hosts have not yet been identified. The investigation continues. At the Laboratory where microscopic examinations of urine totalled 45 154 ova of *S. haematobium* were discovered in 49 cases and *S. mansoni* in 7 the latter organism was also found 22 times in 20,321 faecal specimens other findings including *ascaris* 895 times *trichuris* 1,597 *taenia* 193 *ankylostome* 179.

Seven new cases of *leprosy* were reported and 4 deaths were ascribed to this cause during the year Among 11 163 pharyngeal swabs examined at the Government Laboratory *Mycobacterium leprae* was found in 16 cases undergoing treatment in the Moravian Institute Jerusalem.

*Veneral Diseases*—At the principal centres of population where the Clinics for men and women continued to function with

success (see this *Bulletin* 1937 Supp p 117\*) considerable advance is reported in the treatment of these diseases. The appointment of a specialist Medical Officer enabled more systematic attention to be devoted to the problem of venereal disease, and the treatment of endemic syphilis or "*Firjal*" was conducted on better organized lines for the highly infected population in Hebron and sub-district by mass examination of whole villages successively and treatment of all Wassermann positive cases it is hoped this endemic syphilis may be completely eradicated. The record of work shows 9 729 attendances at treatment centres as compared with 3,990 in the preceding year while during the year 560 cases of syphilis and 81 of gonorrhoea were notified. Blood samples received at the Laboratory for examination numbered 8,240 and of these 837 proved positive by the Wassermann and 1 143 by precipitation tests, while of 2,282 urethral and vaginal discharges examined microscopically 254 contained *N. gonorrhoeae*.

Among other diseases mentioned in the Report it is noted that three deaths were ascribed to rabies two of these occurring among untreated persons who had been bitten. At the 38 provincial centres supplied with the Department's anti-rabic vaccine 1,808 bitten persons were treated though in 458 cases treatment was discontinued after 10 days as the biting animal remained alive and well among the remaining 1,350 cases treated only one death occurred symptoms of the disease appearing more than 15 days after the completion of treatment. Of 71 brains from suspected rabid animals examined at the laboratory 25 contained Negri bodies. The Laboratory Report contains a detailed account of the anti-rabies institutes and treatment centres, results of treatments, measures of control, etc. Tetanus was responsible for 41 cases and 28 deaths erysipelas for 243 cases and 28 deaths whooping cough 667 cases and 11 deaths influenza 234 cases 3 deaths.

*Scientific*—The fully equipped Central Laboratories of the Department are situated in Jerusalem, and there are also branch laboratories established at Haifa and Jaffa. The Department exercises supervisory control over other laboratories and scientific institutes maintained by private funds. Anticipated additions to personnel and special equipment were not realized owing to the civil disturbances and their adverse effects upon budgetary estimates yet the volume of work dealt with by the Bacteriological Division again showed an increase 253 017 specimens were received for examination, and in addition large supplies of prophylactic and curative vaccines etc. were prepared. The principal specimens received and findings recorded have already been the subject of brief reference in the preceding notes. It remains to say that though disturbed conditions combined to hamper research and epidemiological investigation much useful work was continued these enquiries included work on the endemic typhus of Palestine, the degree of virulence possessed by positive cultures of *C. diphtheriae* the prophylactic power of variously prepared anti-enterica vaccines etc. The work of the Entomological Division during the year was referred to in the notes on malaria above. In the Chemical Division 9 188 samples were examined as compared with 11 194 in the preceding year the decrease being attributed to curtailment of sampling and diminished industrial activities consequent upon the civil unrest. Special investigations

were carried out in connexion with local soils in the citrus belt the following scientific papers were published —

PUFFELES (M) The problem of chlorosis in citrus trees.— *Hassadeh*  
Vol. 16 No 6

— On the cause of chlorosis in a mulberry tree.— *Hassadeh*.  
Vol 16. No 10

— A preliminary survey of some soils of the Jordan Valley —  
*Hadar* Vol 9 Nos. 9 and 10

BAKER (G W) Electrolytic application of the hydrobromine test for copper — *Analyst* 1936 726 603

*Financial*—Estimated expenditure on Medical Department Services for the financial year April 1st 1936 to March 31st 1937 amounts to £P 242,831 a sum which represents 3.9 per cent. of the total expenditure of the Palestine Government during the same period. [It is noted that in the preceding issue of this Supplement expenditure was recorded as £3,211 062 whereas it should have read £P 211 062 the letter P (Palestinian pounds) having been replaced by an incorrect 3 ]

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THE REPORT FROM THE EMIRATE OF TRANS-JORDAN HAD NOT BEEN  
RECEIVED AT THE TIME OF GOING TO PRESS

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### CYPRUS (1936)

Cyprus, an island in the eastern Mediterranean lies some 40 miles south of Asia Minor 60 miles west of Syria and 240 miles north of Egypt. Its area is 3,584 square miles (about that of Norfolk and Suffolk combined) Nicosia, its capital lies near the centre of the island

*Stat Statistics*—The relevant facts are set out below —

Area	Estimated Population	Birth Rate	Death Rate	Infant Mortality Rate
(a) <i>The Colony</i>	367 216	34.3	12.4	105.2
(b) <i>Districts—</i>				
Nicosia	118 409	32.9	11.9	87.0
Larnaca	47,977	32.1	11.1	90.6
Limasol	59,654	36.2	14.6	132.8
Famagusta	75 464	37.1	11.3	103.8
Paphos	44,514	35.2	15.8	132.5
Kyrenia	23 198	35.9	13.4	89.8
(c) <i>Principal Towns—</i>				
Nicosia	26,312	27.0	12.4	88.3
Larnaca	12,960	25.0	14.8	113.8
Limasol	16 408	29.1	13.6	104.5
Famagusta	11,531	25.9	8.4	107.0
Paphos	4 724	15.4	13.5	114.9
Kyrenia	2,256	49.2	14.1	54.0

*European Officials* resident numbered 114 with an average number resident of 76—no invalidings or deaths were recorded. There were 1,530 resident *Cyprici Officials* with an average number resident of 1,780. Twenty were invalided and 12 died during the year.

*Maternity and Child Welfare Work.*—According to Hospital Returns 552 labour cases were dealt with at the six hospitals, and of this total 234 were recorded in the Nicosia Hospital Maternity Wards with 238 births and 2 maternal deaths. The training of midwives under the direction of Dr H. STAMBOURIS was continued. 15 pupils were successful at the local examination, and 15 commenced the course of training during the year. Government midwives and their pupils attended 294 confinements during 1936.

*The Child Welfare Clinics* continued to function with success in four of the principal towns with a steady increase in the volume of work. The new building referred to in these notes a year ago was completed and brought into use. The Child Welfare Associations held local Baby Shows in their respective towns and the Annual Baby Show and Health Exhibition organized by the Medical Department in co-operation with these Associations was successfully staged at Larnaca.

*School Hygiene.*—The combined and continued efforts of Medical Officers and of the Director of Education and his staff, succeeded in maintaining the improvements previously commented upon (see this *Bulletin* 1937 Supp. p. 122\*). Teachers are said to be taking greater interest in the sanitation of their schools and welfare of their pupils. Latrines are being provided in increasing numbers and instruction in personal and general hygiene regularly taught. The Honorary Dentist in charge of Dental Clinics reports an increase in school dental work. During the year 338 schools were visited, 13,991 pupils examined and oral treatment given where necessary. In the Nicosia Kyrenia Districts 76 per cent. of the 6,549 children examined had defective teeth.

*Public Health Sanitation etc.*—A scheme providing for the reorganization of Medical Department services became effective on February 1st. The changes introduced are expected to produce increased efficiency and smoothness in the administration of all services. The scheme is described in detail in an Appendix to the Report under review. An important event during the year and one marking a distinct advance in rural health control was the passing of the new Public Health Village Law. This instrument provides for the strict control of village sanitation, regulation of village markets etc. Anti-malarial work continued to be carried out intensively. Complete surveys were carried out by the International Health Division of the Rockefeller Foundation in marshy areas responsible for intensive *A. gambiae* breeding (see also this *Bulletin* 1937 Supp., p. 124\*). The main difficulty in malaria control in Cyprus is however in dealing with streams and shallow pools, the breeding places of *A. tritaeniorhynchus*.

With regard to *sewage disposal* it is said that though new houses often have water-carriage systems to septic tanks installed, frequent shortage of water so seriously impairs the efficiency of such installations, that an improved pattern of pit-latrines appears to be the only solution. Village sanitation has made little or no progress—the

absence of latrines in rural areas is a causative factor in the numerous epidemics of typhoid reported in the Island. Again the only reference made to *water supplies* (see this *Bulletin* 1937 Supp p 122\*) appears to occur in the Government Laboratory Report where it is noted 72 samples of water (mostly from proposed new sources of supply) were examined and only 42 of them were found to be potable.

Though much has been done to improve *housing conditions* in the principal towns much still remains to be accomplished if the mistakes of the past are to be corrected. The difficulty attending efforts to improve conditions are commented upon and special mention is made of the problem of overcrowding in mining areas and surrounding villages and of the importance of providing better ventilation in village houses. Housing conditions in mining areas received special attention a building programme of some magnitude is to be implemented by the Cyprus Mining Corporation.

The *Sanitary Inspectors School* opened in November with 25 pupils the course covers 5 months followed by 2 months practical work. In addition arrangements exist for Sanitary Inspectors in outlying stations to attend refresher courses.

*Recommendations* made by the Director of Medical Services include the appointment of a Tuberculosis Officer of a full time Dental Officer provision of a training school for nurses a travelling eye clinic and an out patient clinic and dispensary on Troödos.

*Port Health Work*—During the year the Medical Staff visited 602 steamships and 531 sailing vessels arriving at Cyprus ports and in addition examined 37 aeroplanes arriving in the Island.

*Hospitals Dispensaries etc*—The work at Government Hospitals both surgical and medical, is said to have increased to such an extent that beds were always occupied so that many cases seeking admission had to be refused daily. There are Government Hospitals in Nicosia and Limassol and State aided Hospitals in four other towns. Work at these institutions may be tabulated as follows—

Hospital	Beds	In-patients	Deaths	Out patients
Nicosia	108	1,885	64	29,422
Limassol	45	783	42	9,970
Larnaca	55	1,034	24	6,900
Famagusta	38	837	20	6,407
Paphos	28	557	26	4,200
Kyrenia	32	571	17	2,525

Work of construction on the new Nicosia Jubilee Hospital was started and certain sections were almost completed by the end of the year. An illustration of the new building appears as a frontispiece to the Report under review. Various improvements were carried out to the Hospitals in Famagusta and Kyrenia and a new building for the accommodation of nurses was completed at the Paphos Hospital. The *Rural Hospitals* continue to do excellent work. The Lyxi Hospital approaches completion and a new hospital at Polis was to be opened during 1937.

There are *Dispensaries* attached to each of the Hospitals in the six principal towns and 10 rural dispensaries established in various parts



of the Island. At these centres 88,470 new and 87,631 old cases received treatment. The new system of *Malaria Certificates* (see this *Bulletin* 1937 Supp. p. 123\*) resulted in the addition of nearly £2,000 to hospital revenues.

An excellent *Isolation Hospital* has been built by the Cyprus Mines Corporation.

The notes which follow briefly summarize more extended references and descriptions of morbidity experience contained in the Report under review.

*Malaria* not being a notifiable disease it is not possible to measure incidence in the Island with any degree of accuracy. Fewer cases were reported during 1936, namely 12,779 as compared with 17,917 in the preceding year, but malaria cases are said to have constituted no less than 75 per cent. of the total in- and out patients suffering from communicable diseases during 1936. Among 536 hospital in-patients *benign tertian* infections numbered 412, *subtertian* 87, *malaria cachectica* 36 and *quartan* one; the corresponding distribution among 12,228 out-patients being 9,392, 775, 1,630 and 431. There were also 15 non-fatal out patient cases of *blackwater fever*.

Brief reference has already been made to the malaria control work carried out by the Department and the special surveys conducted by members of the International Health Division of the Rockefeller Foundation (see *Public Health* above). As an Appendix to the Annual Report is presented a comprehensive account of the activities of the Rockefeller Foundation contributed by Drs. W. K. STRATMAN, THOMAS M. A. BARBER, and Mr. J. C. CARTER. This special report has been reviewed at length in this *Bulletin* 1938 Vol. 35 p. 257. At the Government Laboratory where 511 blood films were examined 39 were positive with *P. falciparum* and 35 with *P. vivax*; it is added that as the majority of films for the routine examination for the presence of malaria parasites are not sent to the laboratory, these findings are no indication of the prevalence of the disease.

*Enteric fever* is said to be increasing with such steady persistence as to give rise to no little anxiety, the numerous outbreaks being attributed to the absence of latrines in rural areas (see *Public Health* above) where without exception the system of open yard latrine is the rule. During the year 687 cases were reported, a 21 per cent. increase over 1935 experience and 44 deaths were ascribed to the disease. Hospital in-patients numbered 182 with 23 deaths; all were *Bact. typhosum* infections. Among 199 out patients types of infection were 187 *Bact. typhosum*, 9 *Bact. paratyphosum*, 4 *B. paratyphosum* B and 2 undefined. The Report supplies details of reported cases tabulated with distinction of sex, age, locality and season. Temporary hospitals were established in villages where the disease occurred in epidemic form, and the usual routine precautions taken. T.A.B. inoculations were carried out on a large scale, but on account of the reaction it is stated a large number of persons refused to submit to a second inoculation. At the Laboratory where 721 specimens of sera were examined for the presence of the specific agglutinins of the enterica group, 292 proved positive to *Bact. typhosum*, 44 to *Bact. paratyphosum* A and 25 to *Bact. paratyphosum* B.

The incidence of *dysentery* is said to have steadily declined since 1930. Unsanitary conditions especially in rural areas, contribute

to maintain the infection. During the year 51 cases were reported as compared with 133 in the preceding year. The disease appears to show a preference for the 0-5 age-group but it is believed a considerable number of the cases reported among children at these ages were not real dysentery but the ordinary enteritis of the summer season. There were 10 non fatal cases among hospital in patients type of infection was undefined. Among 30 out patients 7 were suffering from the amoebic and 23 from the bacillary form of the disease. At the Laboratory where 70 faecal specimens were examined, the findings included one *E. histolytica* one the cysts of *E. histolytica* and one *Bact. dysenteriae* Flexner. It is stated that few parasites of the Shiga type have been observed and bacteriologically confirmed.

In one section of the Report it is stated that *cerebrospinal meningitis* made its appearance in July the first case being reported from Famagusta District. In another place where cases are tabulated by District and month of occurrence Famagusta is not mentioned but one case was reported in Nicosia and one in Limassol in September. In any case between September and the end of the year 38 cases with 10 deaths [Hospital Returns record 43 cases] were reported from Nicosia Limassol and Paphos Districts. Routine activities were abandoned when cases were reported and all efforts were directed towards meeting the emergency. At the close of the year the epidemic was still in existence a detailed report is to be submitted.

*Diphtheria* is said to have given rise to 31 cases the majority of them occurring in the Nicosia District. 24 of the cases occurred in the 0-5 age-group and 5 in the 5-10 group. Hospital Returns record 3 cases with 1 death among in patients and 10 out patient cases. No case of *smallpox* or *plague* occurred. During the year 11,939 anti-smallpox vaccinations were performed and anti-rat measures carried out at the principal ports. At the Laboratory 847 rat spleen smears were examined all were negative for *Past. pestis*.

*Tuberculosis*—The funds collected during the Silver Jubilee of the late King George V for the erection of a modern sanatorium for the care and treatment of cases of tuberculosis were augmented by a gift of £10 000 from the Colonial Development Fund. As soon as a suitable site has been selected constructional work will be commenced. Mr D. N. Dimitrion has given £3 000 for the building and equipment of a Tuberculosis Dispensary at Larnaca this building should be completed during 1937.

The Anti-Tuberculosis League is firmly established and actively engaged in the routine care of needy tuberculosis sufferers. The League magazine *Cyprus Public Health* which deals with the prevention of the disease is distributed monthly to schools etc. During the year the National Association for the Prevention of Tuberculosis donated £100 towards the cost of establishing a tuberculosis dispensary at Nicosia and also arranged for Dr N. D. Bardswell a recognized authority on the disease and Nurse Jays to visit the Island and co-operate with the Medical Department in efforts to deal with this important public health problem. The visitors assisted by various officers of the Medical Department are engaged on a survey throughout the Island. The inadequate accommodation for male patients at the Athalassa Sanatorium was augmented, and through the generosity of Mr M. C. Georgiades a pavilion for the accommodation

of 8 female patients was erected. The Honorary Physician, Dr T K. EVANGELIDES contributes a special report on the year's work at this institution.

During the year 280 cases of *pulmonary tuberculosis* were reported in the Island. It is stated that as notification is incomplete the recorded facts are no measure of actual incidence. Among 185 hospital in-patients treated for all forms of tuberculosis with 34 deaths 118 were suffering from the pulmonary form of the disease and 29 died. Among out patients 228 out of 366 tuberculosis patients were pulmonary cases.

It is stated that as finances permit tuberculosis control work will develop along lines requiring (a) the appointment of a full-time British Tuberculosis Officer (b) of Tuberculosis Nurses and (c) the establishment of Tuberculosis Dispensaries at Nicosia, Larnaca, and Limassol.

*Trachoma* as shown by notified cases, is a major Public Health problem, and serious efforts are necessary to bring it under control. During the year 8,983 cases were notified and approximately 15,000 cases of eye disease, mostly trachoma were seen. The Honorary Oculist dealt with 2,983 new cases of which 1,499 were trachoma, and the three Travelling Oculists with 8,590 new patients, of which 7,464 were suffering from trachoma. Fifteen nurses received special training in the Government Hospital, and later were posted at trachoma centres where incidence was highest to carry out routine treatments prescribed by the Travelling Oculists. It is hoped to increase their numbers in the near future and also to provide a travelling eye clinic adequately staffed.

*Veneral Diseases*—The Medical Officer in charge of V.D. Clinics, Dr N MICHAELIDES contributes as an Appendix to the Annual Report a comprehensive survey of the year's work at the five established clinics. Altogether 1,967 new and 1,026 old cases were dealt with amongst male patients. Among the new patients were 331 cases of *syphilis* and 574 of *gonorrhoea*; the corresponding figures for old cases continuing treatment were 668 and 338 respectively. Among 853 new female patients, 182 were suffering from *syphilis* and 308 from *gonorrhoea*. There were also 1,014 female patients continuing treatment and of these 514 were syphilitics and 500 suffering from gonorrhoea. Blood samples submitted to Wassermann tests from the clinics totalled 4,389 and of these 1,316 gave positive and 100 doubtful reactions. The Laboratory Report records 4,698 Wassermanns of which 1,269 reacted positively and 344 gave doubtful reactions. The campaign against V.D. was continued throughout the year.

*Leprosy*—To the Leper Farm Hospital which has accommodation for 12 patients 66 admissions were recorded during the year. At the clinic attached to this hospital lepers are given their injections and dressings. At the Leper Farm itself 14 patients were admitted, 3 died, and 11 were paroled during 1936 and at the end of the year there remained 105 lepers at this institution.

Dr S LYSAANDRIDES Medical Superintendent of the *Mental Hospital* again contributes in an Appendix to the Annual Report a detailed account of the year's work at that institution. He observes that during 1936 the number of patients admitted and the number under treatment were the greatest ever recorded. Patients admitted or re-admitted

totalled 64 ten died 34 were discharged, and at the end of the year 205 remained. A 12 bed hospital for the treatment of patients physically ill has been erected.

Other diseases commented upon in the Report include the following. In patients suffering from cancer numbered 195 and 9 of them died there were also 252 out patients treated for this condition. In an Appendix to the Annual Report the Surgical Specialist Dr C. C. CURT deals at some length with the work of his Department and among other matters supplies a detailed survey of the results of radium therapy and the surgical operations carried out for malignant disease. *Rheumatism* appears to be the cause of much disability 116 in-patients and 3162 out patients received treatment for the disease. With regard to *helminthic diseases* it is noted that no cases of *ankylostomiasis* or *schistosomiasis* were recorded. Of the latter condition it is stated the disease has almost disappeared and that the snail hosts of the infection are not readily found. Hospital cases of *ascariasis* numbered 197 of *taeniasis* 60 and of *oxyuriasis* 217. No less than 2,918 persons received hospital treatment for wounds of various kinds 1,520 having been caused by stabbing or cutting instruments.

[It is noted that in the *Returns of Diseases and Deaths* the nomenclature employed is that of the International Commission 1920. The most recent revised International List is that of 1929.]

*Scientific*—The eleven *Special Reports* figuring as Appendices to the Annual Report are (1) Report on the Re-organization of the Medical Department, by the Director of Medical Services Dr E. A. NEFF (2) Report of the Surgical Specialist (3) Pathologist (4) Chemist (5) International Health Division Rockefeller Foundation (6) Mental Hospital (7) Communicable Diseases (8) V D Clinics (9) Honorary Dentist (10) Athalassa Sanatorium and (11) Limassol Municipal Health Report. The majority of these have already been quoted in the preceding notes.

*The Report of the Pathological Branch* records a further increase in the volume of work dealt with. During the year 10,031 specimens of various kinds were received examined and reported upon—the more important of these and findings recorded are briefly referred to under various headings in the preceding summaries. *The Government Analyst* received and analyzed 1,671 samples of which 1,657 were from official sources and included 849 samples of foods and drugs. The Government Analyst who was on the Board of Examiners in Pharmacy for the Government Qualifying Certificate also gave a course of lectures on subjects of sanitary importance at the School for Sanitary Inspectors.

The following scientific papers were published —

WILLMOTT (S. G.) A Study of *Colocasia* (*Colocasia antiquorum* Schott) — and FREEMAN (M.) Potassium Permanganate Poisoning [This paper was noted in this *Bulletin* 1937 Supp., p. 127\*.]

*Financial*—Total expenditure on Medical Department services during 1936 amounted to £53,555 a sum approximating 7 per cent of the total expenditure of the Colony for the year under review.

## GIBRALTAR (1936)

Gibraltar consists of a long mountain block (the "Rock") rising to a height of 1,398 feet, 3 miles long and  $\frac{1}{2}$  mile broad, joined by a low sandy isthmus to the southern extremity of Spain. The town is built on the western and southern sides of the Rock, facing the Bay of Algebras the northern and eastern faces are inaccessible cliffs.

*Vital Statistics*—At the end of the year the Police estimate of the resident population was 19 194 persons 16,875 were British subjects and 2,319 were Aliens. The revolution which broke out in Spain in July caused a considerable influx of refugees from neighbouring ports of Spain exact numbers are unknown but the Medical Officer of Health was of the opinion that for a short time after the 18th of July "the excess population was not far short of ten thousand." Statistical facts refer solely to the normal resident population. Registered births numbered 304 and deaths of British subjects 249 and resident Aliens 12, or a total of 261. [The crude birth and death rates are given as 19.3 and 15.47 respectively but it is difficult to know how these rates were calculated. On the basis of end-of-year total resident population (no mid-year estimate is supplied) the birth rate would be 15.8 and the death rate 13.6 per 1 000. The same sort of difficulty was experienced a year ago in regard to methods applied for the calculation of rates (see this *Bulletin* 1937 Supp. pp. 127\*-128\*)].

Infant deaths numbered 19 and the infant mortality rate is stated to be 62.09 per 1 000 births. [If the latter were true then it would appear to have been calculated on a basis of 306 births (presumably all live births) but if on the basis of 304 births the rate would be 62.5 per 1 000. In another part of the report it is stated 23 stillbirths were recorded. If these were included in the 304 births referred to then the I.M.R. would correctly be 67.6 per 1 000 live births].

*Maternity and Child Welfare Work*—During the early part of the year the plans for increasing accommodation at the Colonial Hospital were carried out (see this *Bulletin* 1937 Supp. p. 128\*). Had this not been done it would have been impossible to deal with the large numbers of patients, for 283 women were admitted to the Maternity Wards during the year. Of the total admissions 176 belonged to the resident population and 107 were British subjects ordinarily resident in Spain and Spanish subjects temporarily living as refugees in Gibraltar. These groups were delivered of 151 and 90 babies respectively. At the Colonial Hospital one pupil commenced the course of training in midwifery. Of the work of midwives the only reference in the Report mentions that one under contract with the Public Health Department attends the confinements of poor persons (see also this *Bulletin* 1937 Supp. p. 128\*).

At the *Child Welfare Centre* fortnightly meetings continued to be held and the average attendance was 88. Milk and other foods were distributed at reduced prices or free in necessitous cases. The nurse paid 420 home visits and during the year 225 children were treated in the Children's Ward of the Colonial Hospital.

*School Hygiene*—During the first six months of the year visits to 28 schools were paid and 185 children referred to the Medical Officer for examination and treatment. 40 were found to be suffering from

defective vision or other eye defects 45 from skin diseases 31 from enlarged tonsils 49 from general debility and the remainder from other conditions 129 of these children attended the School Clinic for treatment

The School Dentist treated 478 children for various oral defects and continued his voluntary talks to children in the schools. The Soup Kitchen financed by voluntary subscriptions and operated by voluntary workers continued to play an important part in maintaining nutrition during the winter months the average daily attendance was 550

*Public Health Sanitation etc.*—For descriptions of the Medical Services directly administered by the Colonial Government the sanitary work under the City Council and the Board of Health Quarantine Services see this *Bulletin* 1933 Supp p 114\* 1935 p 115\* and 1936 p 119\* *Sewage and Refuse disposal* methods remain for all practical purposes as described on page 100\* of the 1934 issue of this Supplement.

With regard to potable *water supplies* it is reported that a new reservoir of one million gallons storage capacity was completed and brought into use and that extensive repairs and renewals to catchment areas were carried out during the year *Brackish water* is supplied from wells for general purposes other than potable

In August H E the Governor appointed a Commission of Enquiry on the Housing Rent Restriction etc to report upon the position in Gibraltar the results of the enquiry will be referred to in the 1937 Medical and Sanitary Report With a view to testing the value of some of the Commission's proposals a block of model tenements for the working classes was designed and erected families from properties in bad repair were removed and though rents were higher willingly accepted the exchange to the new dwellings. The experiment proved highly successful.

The routine supervision of milk and food shops inspection of foods for human consumption etc was continued and samples taken for analysis from time to time (see this *Bulletin* 1937 Supp p 129\*) For some weeks following the outbreak of hostilities in Spain there was in acute shortage of *milk supplies* but the situation became normal towards the end of the year

The outbreak of *hostilities* in Spain in July imposed additional responsibilities on the Public Health Authorities of Gibraltar and emergency measures had to be devised to meet exceptional conditions. For the accommodation of refugees who flocked to the Colony a Camp under the control of a Commandant was established at the North Front with a Medical Clinic exists as the quarantine medical and surgical cases were dealt with at the Colonial Hospital.

*Port Health Work*—The Board of Health exists as the quarantine authority for the Colony (see also this *Bulletin* 1937 Supp p 129\*) During the year 4 971 ships called at the port 77 cases of sickness were landed from British and 29 from foreign vessels. Rat destruction continues to be carried out 96 carcasses were examined at the Laboratory none was found to be plague infested.

*Hospitals Dispensaries etc.*—The year's record of work at various institutions in the Colony may be set out as follows —

Institution	Admissions	Treated	Died	Out-patients
Colonial Hospital	1 641	1 789	174	11,606
Isolation "	Three cases of leprosy (see this <i>Bulletin</i> , 1937 Supp. p. 129*)			
Mental "	9	45	4	—
Home for Sick and Aged	—	55	—	151 in receipt of outdoor relief

The work of the Colonial Hospital was appreciably influenced by the civil disturbances in Spain. In-patient cases increased from July to the end of the year and the abnormal movement of shipping combined to bring in a number of cases of sick seamen. Principal features characterizing health experience in the Colony during the year included the following:—

Recorded cases of infectious diseases totalled 177. *Diphtheria* was responsible for 44 cases with 2 deaths from laryngeal infections; all other cases were mild in type. At the Laboratory where 96 throat swabs were examined 39 contained the Klebs-Loeffler bacillus while a pure culture of virulent *C. diphtheriae* was obtained on one occasion from a leg ulcer. Of enteric fever 17 cases were reported and two patients died; no source of infection could be traced. Among 42 Widal tests at the Laboratory 22 bloods agglutinated positively with *Bact. typhosum* H and three with *Bact. paratyphosum* B. (The blood of all persons about to be employed as milk vendors waiters etc. is serologically examined to detect possible carriers of the enterica group of bacilli.) Only 3 cases of dysentery were notified.

Thirty new cases of pulmonary tuberculosis and 19 deaths due to this cause were registered. Further consideration was given to the control and treatment of the disease and during the year a Medical Officer with special experience of tuberculosis was appointed (see also this *Bulletin* 1937 Supp. p. 130\*). Of the 125 specimens of sputum examined at the Laboratory 18 per cent. were positive with *Mycobacterium tuberculosis*.

The Venereal Diseases Clinic established in the Colonial Hospital dealt with 44 in-patient cases distributed as to 11 syphilis 8 soft chancres and 23 gonococcal infections. The usual examinations of blood and cerebrospinal fluid for Wassermann tests and pus smears for gonococci were undertaken at the City Council Laboratory. 68 out of 753 Wassermanns gave positive results and the gonococcus was found in 34 smears.

Other experiences referred to in the Report under review included the following:

Though no cases of rabies was recorded, for the first time a course of preventive inoculations was given to a British seaman bitten by a rabid dog in Valencia. The first recorded death from tetanus in the Colonial Hospital was recorded following an accident in Gibraltar; the case may not have been a true Gibraltar infection as the boy was wounded by the shaft of a Spanish cart. After the occurrence of this fatal case it was however considered advisable to give preventive inoculations in cases of street accidents etc. Gas gangrene was recorded for the first time in the Colony with two cases in boys, one was brought in from Spain and lived only 4 days. The second was a Spanish boy

who sustained a compound fracture of the leg by falling from a tree in Gibraltar after injections of anti-gas gangrene serum and amputation of the leg he made a good recovery. The first case of kala-azar to be recorded in Gibraltar occurred in an Indian ship's fireman probably infected in Egypt. Thirty-one cases of scarlet fever 24 of measles 23 of chickenpox one of undulant fever and one of cerebro-spinal meningitis were among other diseases reported. No case of smallpox occurred 365 primary and 310 re-vaccinations were performed during the year.

**Scientific**—A summary of the Laboratory work is supplied by the City Analyst and Bacteriologist Mr A G HOLBOROW F.I.C. During the year under review 6150 samples of various kinds were received examined and reported upon. Many of these have been the subject of brief mention in the preceding notes but it remains to say that public supplies of drinking waters were bacteriologically tested each month and remained free from pollution throughout the year. Serological agglutination tests were carried out on 115 goats all with negative results one human blood specimen agglutinated positively for *Br. melitensis*. Other laboratory work included medico-legal and veterinary examinations the testing of oil-carrying ships for the presence of inflammable vapour preparation of autogenous vaccines etc. Mr Holborow refers briefly to his original work on *canine leishmaniasis* and its prevention first referred to in the Medical Report for 1934 (see this *Bulletin* 1936 Supp p 122\* and 1937 Supp pp 130\*–131\*). This work has now been successfully completed. It is of interest to note that as a result of systematic dipping the years 1935 and 1936 marked the absence of the disease among the hounds for the first time in the history of the Royal Calpe Hunt. It is added that in some years all hounds have been known to succumb. Sandflies were suspected as the vectors of infection while ticks fleas and lice were also under suspicion dipping entirely eliminated these pests.

**Financial**—Expenditure on Medical and Sanitary Services amounted to £23,228 the Colonial and Isolation Hospitals accounting for £15,528 of the total expenditure.

### MALTESE ISLANDS (1936)

The Maltese Islands a group of islands in the Mediterranean Sea, are distant about 58 miles from the nearest point of Sicily 80 from Syracuse, 142 from Reggno and 180 from the nearest point of the mainland of Africa. Malta itself is 17 miles long, 9 broad and has an area of almost 95 sq miles. Gozo 28 sq miles, Comino and Filfla are mere islets the area of the former being about 1 sq mile. The whole group has about half the area of the Isle of Man.

**Vital Statistics**—The recorded facts relating to these Islands continue to be presented in great detail in *Population* total at all ages for each locality and also in age groups 0–1 0–5 and 5 and over *Births* and *Deaths* totals for each locality. Mortality data also presented by causes of death for each month of the year by sex and in 13 age groups for each locality by causes of death for each sex in 17 age groups. Summarizing the principal facts we have —



	Malta	Gozo	Both Islands
Estimated Population ...	236 479	23 686	*62,165
Births	8 110	785	8,895
Birth rate per 1,000	34.2	29.7	33.8
Deaths	4,167	420	4,587
Death rate per 1,000	17.7	16.4	17.6
Infant Deaths	1,545	144	1,689
Infant Mortality Rate per 1,000 Live Births	190.8	186.2	190.3

The Infant Mortality rate though still high, appears to be the lowest ever recorded for these Islands.

*Maternity and Child Welfare Work*—A general service of a preventive and advisory nature for ante-natal and post-natal care of mothers and for infant welfare has still to be set up. Meanwhile consultations for out-patients are held at the Central Hospital and the District Dispensaries. District Nurses visit newly confined mothers and give advice on infant care etc. 8,915 such visits were paid in Malta and 1,118 in Gozo. The Mothers and Infants Health Association in receipt of an annual contribution, has established Health Centres in four towns. Lying-in Wards are provided in the General Hospitals in both Islands. Outside the Hospitals it is said that practically every confinement is attended by a certified midwife. Government paying the fee in necessitous cases.

*School Hygiene* receives no mention in the Report under review except in the observation, "Systematic teaching of the rules of health should form an integral part of the ordinary curriculum in the schools."

*Public Health Sanitation etc*—Dr A. V. BERNARD the newly appointed Chief Government Medical Officer pays a generous tribute to the valuable public health work accomplished by his predecessor Dr A. CARTER who retired from the service in October 1936.

As regards general sanitation, towns, suburbs, and several villages are provided with water-borne *sewerage* systems. Several extensions were carried out during the year. Where no sewers exist house drains are connected with impervious cess-pits. Towards the end of the year the objectionable methods characterizing the unorganized collection of refuse were abolished, and an improved service inaugurated. Piped water supplies are available in almost every part of both Islands. Drought conditions during the year necessitated restricted supplies. New storage galleries when completed will provide welcome increases in main supplies. *Housing* accommodation increases fairly satisfactorily. All new buildings alterations and additions to existing buildings, etc. must first receive the approval of the Superintendent of Public Health. The routine inspection of food of shops, stores, slaughter-houses etc. continued as usual. In a series of Appendices to the Report under review detailed accounts of the various public health services are presented.

*Port Health Work*—The Quarantine Medical Officer is also Medical Officer of the Infectious Diseases Hospital in Malta. The year's work is described at length in an Appendix to the Annual Report. Briefly, 1,971 steamships and 131 sailing vessels entered Malta ports and the arrivals of 6 British and 95 foreign aircraft were recorded. Inward

passengers numbered 13,333 and outward passengers 12,052. Eighty-seven steamers were kept in quarantine. 65 reported having or having had infectious diseases on board. Three cases of infectious disease among passengers and crews were admitted to the Contagious Disease Hospital and 11 to other hospitals. A Sanitary Inspector was appointed to the Port Health Staff during the year. The trapping of rats in harbour areas continued. It is stated that none was found plague infested (but see also *Plague* below).

*Hospitals Dispensaries etc.*—These institutions are occasionally mentioned here and there in the text of the Report but are not dealt with in detail in any separate section. Available information seems to indicate that four institutions have accommodation for in-patients and facilities for the treatment of out patients *viz.* the Central Hospital, Connaught Hospital, Gozo Hospital and the Poor House. There are also a number of District Dispensaries.

Twenty-six diseases are scheduled as compulsorily notifiable. No case of smallpox, cholera, yellow fever, typhus, dengue, indigenous malaria or hydrophobia has been recorded for many years, but the remaining 19 titles on the notifiable list gave rise to 2,560 cases with 370 deaths. At the Contagious Diseases Hospital 351 cases were treated and among these 27 deaths occurred. The principal diseases referred to in the Report may be summarized as follows:

*Plague* occurred in April the Islands having been practically free from the infection for over a century. Suspicious symptoms were first reported in three members of the same family, two died and post mortem bacteriological investigation showed infection with *P. pestis*. Energetic measures were promptly instituted to deal with the infection for further investigation indicated an epizootic among rats. A fourth case was discovered at the end of April and thereafter cases continued to occur each month until November. During the whole period 25 cases were recorded, 19 of them gave positive bacteriological findings and 10 deaths were ascribed to the infection. At the Laboratory where 2,069 rats and mice, 28 cats, 17 rabbits and 9 guinea-pigs were examined, 16 rats, one cat and one guinea-pig were found infected with *P. pestis*. Dr. Bernard contributes a survey of plague history in Malta from the beginning of the 19th century. District Medical Officers describe cases occurring in their respective areas and the measures taken to localize the infection. The outbreak has been reviewed at some length in this *Bulletin* 1933 Vol. 35 p. 205.

No case of smallpox occurred. 4,281 primary vaccinations (infants) were performed by District Medical Officers and 89 per cent. were reported successful. *Diphtheria* was responsible for 115 cases and 14 deaths. Prophylactic inoculation is said to have made no headway in the Islands. Scattered cases occurred during every month of the year. *Scarlet fever* incidence showed a further decline with 40 cases and one death. The tail-end of the *measles* epidemic which characterized 1934 and 1935 appears to have been reached for only 52 cases all non-fatal were recorded. On the other hand *whooping-cough* showed increased incidence with 381 cases and nine deaths.

*Enteric fever* shows the lowest incidence for many years, 163 cases and 28 deaths. The infection was mostly of the summer type, unconnected with the piped water supplies and confined to the poorer and less careful classes of the population.

Fewer cases and deaths due to *undulant fever* were recorded, viz., 873 cases and 52 deaths or a decline of 33 per cent. in incidence and 35 per cent. in mortality by comparison with 1936 experience. The routine testing of goats for *Br. melitensis* was continued throughout the year 9.4 per cent. of the animals gave positive reactions and were destroyed. In January 1936 the *Undulant Fever Research Station* commenced their investigations—research will principally be directed towards the preventive immigration of goats. Work on the building of the *Milk Pasteurisation Station* was started and a Manager of the Milk Centre appointed. A safe supply of fresh milk should shortly be available.

Notified cases of *pulmonary tuberculosis* numbered 173 and deaths due to this cause 109. The decline in incidence and mortality is attributed to favourable climatic conditions and absence of influenza (only 18 cases of the latter). The erection of a Tuberculosis Block, Sanatorium for Convalescents, Tuberculosis Clinics and provision for the after-care of the tuberculous are among the recommendations made for dealing with the disease.

During the year under review 232 new (see this *Bulletin*, 1937 Supp. p. 133\*) and 1,073 old cases of *trachoma* were reported, 187 of the former and 533 of the latter being recorded in Malta. Ample facilities for free skilled treatment are available in both Islands. At the Ophthalmic Clinic of the Central Hospital, 520 persons were treated 93 as in-patients. In the Special Wards of the Poor House 78 patients were accommodated and at the Victoria Hospital Gozo 45 patients were dealt with. School-children receiving treatment in Malta averaged 323 per month and in Gozo 294. District Dispensaries in Malta dealt with an average of 241 patients per month and 192 in Gozo.

Other diseases mentioned in the Report include 83 cases of *pneumonia* with 30 deaths, 150 of *broncho-pneumonia* and 98 deaths, 3 non-fatal cases of *acute anterior poliomyelitis*, 2 non-fatal cases of *cerebrospinal meningitis*, 2 fatal cases of *encephalitis lethargica* and 68 cases of *erysipelas* with 3 deaths.

*Scientific*.—At the Laboratory the 12,733 samples received and dealt with included 6,132 bloods, 3,547 of foods, beverages, etc., 2,206 pathological specimens and 848 water samples. The results of the various examinations are set out in a series of Tables. The activities of the Staff were mainly concerned with plague work—cases investigated are described in some detail. Among other items of work it is noted that District Medical Officers and Private Practitioners submitted 4,196 samples of human blood for serological test of undulant and typhoid fevers. 982 agglutinated positively with *Br. melitensis* and 51 with *Bact. typhosum*. Also 1,936 specimens of blood from goats, the majority submitted by Officials of the Civil Abattoir, were examined and 182 were declared infected with undulant fever.

*Financial*.—No details covering expenditure on medical services are supplied.

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## CEYLON (1936)

Ceylon an island in the Indian Ocean lying off the southerly extremity of India, has an area of 25,332 sq miles, exclusive of the Jaffna lagoon the area of which is 149 sq miles. Colombo on the west coast, is the capital. Its greatest length is 270 miles from north to south and its greatest width is 140 miles. The total area is rather more than three-fourths that of Ireland.

*Vital Statistics*—The more important facts may be set out as follows —

Races and Communities	Estimated Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Ceylonese	4,958,800	168 755	33.6	110 077	22.2	27 419	165
Europeans (including off-club)	10,200	124	12.2	71	7.0	4	32
Indians	662,200	25 181	37.9	12,891	19.4	4,338	172
All races	5 631,200	192,060	34.1	123 039	21.8	31 789	168

The North-Central and Eastern Provinces showed the highest birth and death rates the Western and most populous of the nine Provinces again had the lowest birth death and infant mortality rates. For urban (36 principal towns) and rural areas the following facts are supplied —

Area	Estimated Population	Birth Rate	Death Rate	Rates per 1 000 live births	
				Maternal	Infant
Urban areas					
(a) Residents and non-residents	762,700	37.6	31.6	32.0	161
(b) Residents only	—	27.5	20.1	—	172
Rural areas	4,868 500	33.5	20.3	19.9	167

It is again noted (see this *Bulletin* 1937 Supp pp 134\*–135\*) that in the rural areas registered causes of death cannot be regarded as dependable. In the 36 principal towns where the majority of deaths are medically certified 24 127 deaths were registered *infant deaths* accounted for 19.1 per cent. of the total, *pneumonia* for 12.8 per cent *malaria* 8.8 per cent and *pulmonary tuberculosis* 5.5 per cent. With regard to causes of death for the Island as a whole 11.8 per cent of the total deaths appear under the title *pyrexia* (undefined).

The mean *Indian population on Estates* is given as 665 000 the birth-rate for these people 37.9 the death-rate 19.4 per 1 000 living and the infant mortality rate 172 per 1 000 live births.

*Maternity and Child Welfare Work*—This continues to receive popular support but demands cannot adequately be met for want of a

sufficient number of public health nurses. Though for the Island as a whole maternal mortality rates show a slight increase over 1935 experience in areas where intensive work on health unit lines is being done they show a decided reduction. *Puerperal sepsis* and *puerperal convulsions* accounted for 80.7 per cent. of the 4,158 deaths of women in childbirth. Of the 31,789 infant deaths recorded 35.6 per cent. were ascribed to convulsions and 21.3 per cent. to debility. Trained midwives provided by Government numbered 141, by local authorities 126 and by estates 121 making a total of 388. It is said that about an equal number are engaged in private practice. During the year legislation relating to the control and practice of midwifery in specific areas was enacted.

*The training of midwives* continued to be carried out at the institutions mentioned in these pages a year ago. 158 women received training during the year under review. The period of training at the Lying-in Home has been increased to one year to be followed by six months of field work with a Health Unit. Also 9 nurses were selected and given training at the Kalutara Totamune Health Unit.

Among the *Indian population on Estates* the infant mortality rate was 172 with debility and convulsions the chief causes of death. The high rate is attributed to lack of skilled attention before, during and after confinement. It is said that few estates employ trained midwives (see above) and that maternity wards in Estate hospitals are not much used.

At the *Ante-natal Clinics* held at the *De Soysa Lying-in Home* 6,739 women made 9,902 visits and at the post-natal clinics 374 mothers paid 477 visits. In addition 4,543 ante-natal and baby clinics were held at 77 centres where 17,393 visits were made by expectant mothers, 29,563 by infants and 18,611 pre-school children were dealt with. Though the number of centres was fewer than in 1935 attendances were higher in all cases (see this *Bulletin* 1937 Supp. p. 135\*).

There are 48 voluntary associations in the Island actively associated with child welfare work with 27 local authorities contributing to the finances of these organizations. The four Lady Doctors continued their work chiefly among the Muslim population (see this *Bulletin* 1937 Supp. p. 135\*) during the year they made 4,709 home visits, attended 203 mothers at childbirth, 1,235 sick expectant women, 1,897 sick infants and 6,778 sick pre-school children. They also held 830 clinics at 14 centres.

*School Hygiene*—School health work continued to be carried out with the full available staff. During the year 2 Medical Officers and an additional trained school nurse were appointed, the total personnel engaged being 6 School Medical Officers, 27 Medical Officers, 21 District Medical Officers and 9 Nurses. The number of schools (excluding those unregistered or of special type) was 4,625 and the school population 673,523. The sanitation of schools received close attention and the provision of adequate requirements more intensively pressed for. The total school population dealt with numbered 341,804, to 1,750 schools 7,597 visits were made and 52,629 children were medically examined. Of the latter 38,483 or 70.5 per cent. showed defects of one kind or another with an average of 1.9 defects per child. The principal findings recorded expressed as percentages of total defects

included defects of teeth and gums (exclusive of dental caries 7.3) 17.6 per cent. hookworm 15.6 malnutrition 10.3 anaemia 7.3 and pediculosis 7.3 (the majority were girls)

Other activities included anti-malarial work with half yearly examination of children parasite and spleen surveys administration of quinine etc. it is noted that during the course of a survey restricted to the examination of boys in selected schools throughout the Island 161 201 were examined and 30.6 per cent showed enlarged spleens. For hookworm 86 771 children were treated in 887 schools. 2,854 school-children received anti-smallpox vaccination while 8 003 first and 6 969 second doses of T.A.B. were administered to school-children during the year.

Active interest continues to be maintained in *School Health Education* work. A special syllabus of lectures and demonstrations for the training of teachers in school health work was drafted. Increased progress is reported in the carrying out of routine health education procedures and instruction in schools. During the year 22 training classes (conducted by School Medical Officers and Medical Officers of Health) were held and 876 teachers trained.

*Public Health Sanitation etc.*—Dr S. T. GUNASEKARA was appointed Director of Medical and Sanitary Services with effect from October 1936 in succession to Dr R. BRIERCLIFFE C.M.G. appointed Director of Medical Services Nigeria (see this *Bulletin* 1937 Supp. p. 145\*). Steady progress is reported. Malaria control and health work on health unit lines received special attention when these services are fully organized and functioning throughout the Island they should prove markedly effective in improving the health of the people. During the year several permanent anti-malarial works were constructed at various malaria campaign centres by the Division of Sanitary Engineering.

As regards *sewage disposal* the control of soil pollution through the construction maintenance and use of sanitary latrines is the chief work of Sanitary Assistants. During the year 22 public and 17 901 private latrines were constructed disposal of night-soil by trenching is carried out in 18 Urban District Council and 94 Sanitary Board towns. Refuse is disposed of by dumping trenching incineration and composting. Further attention to the provision of proper drainage schemes is desirable for the elimination of potential and actual breeding places of anophelines. The Division of Sanitary Engineering carried out a number of improvements during the year.

The question of *water supplies* received the special consideration of the authorities and every effort is being made to improve existing conditions. It is said that a large proportion of the population lacks an adequate and wholesome supply of drinking water. Soil surveys and borings were carried out by the Division of Sanitary Engineering with a view to the discovery of suitable well sites and schemes and estimates drafted in connexion with new proposals for water supplies in various areas. Work accomplished during the year included (a) the construction of 119 new public wells and the improvement of 1 667 (b) construction of a new impounding reservoir (c) adjustment and replacement of certain chlorinator installations (d) preparation of designs etc. for purification works (see also this *Bulletin*, 1937 Supp. p. 136\*).

*Food etc.*—In Sanitary Board and Urban District areas all food handling trades are licensed yearly after inspection and recommendation by Medical Officers of Health. Drafts of legislative measures relating to the control of milk supplies bakeries, aerated water factories, etc. are under consideration (see also this *Bulletin* 1937 Supp pp 136\*-137\*)

*Eleven Health Units* (see this *Bulletin* 1937 Supp p 137\*) were in operation in the Island and functioned satisfactorily throughout the year the additional personnel employed included 2 Medical Officers of Health 27 Sanitary Inspectors 6 Public Health Nurses and 36 Midwives. The work was concerned with community and individual hygiene maternal and child welfare, health surveys and health education school hygiene general sanitation. At 63 maternity and child welfare centres 3 713 clinics were held and large numbers of expectant mothers infants, and pre-school children dealt with In connexion with these intensive health activities the following facts may be noted —

Area Worked	Population	Birth Rate	Death Rate	I M R per 1,000 births	Maternal Mortality per 1,000 births
1,245 sq miles	820,166	29.1	15.3	121.8	12.1

*The training of Sanitary Inspectors* (now called Sanitary Assistants) was continued (see this *Bulletin* 1937 Supp p. 138\*) and during the year out of a class of 40 35 sat for and 33 were successful at the examination of the Royal Sanitary Institute It is noted that 13 Field Medical Officers and 13 Public Health Nurses received special training during the year

*Sanitary conditions on Estates* were reported by inspecting Officers to have been satisfactory out of 459 estates visited only 9 were reported to have been in bad sanitary condition.

*Port Health Work* continues as previously described (see this *Bulletin* 1937 Supp p 137) Various new regulations under the Quarantine and Prevention of Diseases Ordinance 1897 were passed. During the year 2,615 steamers and 147 sailing vessels entered the port of Colombo 64 vessels arrived with cases of infectious diseases on board eight cases were removed to hospital, the remainder being isolated on the ships concerned Thirty-nine cases of human plague were recorded in Colombo and the usual steps were taken to prevent the infection reaching shipping in the harbour regulations making compulsory the fumigation of cargoes from plague-infected ports were introduced At 15 minor ports 550 steamers and 2,360 sailing vessels were dealt with.

Persons passing through the *Mandapam Quarantine Camp* numbered 86,855 and of these 72 passengers and 40 estate labourers were rejected on medical grounds 34 148 labourers were treated for ankylostomiasis and 34 753 passengers and 39,607 labourers were vaccinated. At the *Talapara Quarantine Camp* 51 106 passengers were dealt with, 186 were rejected, and 52,820 were vaccinated.

*Hospitals Dispensaries etc*—All parts of the Island are generously provided by the State with hospitals and dispensaries as regards hospitals the following details relate to accommodation and work accomplished at these institutions during the year under review —

Province	Number of Hospitals	Beds	Patients treated	Hospital Deaths
Western	24	5 408	93,981	6 996
Central	23	1 785	61 116	3,089
Southern ..	11	866	37,599	2,043
Northern ..	11	495	17,560	687
Eastern	6	404	8,286	452
N. Western	9	882	31,491	2,104
N. Central	3	200	8,368	514
Uva ..	12	700	22,839	968
Sabarnagumwa	13	996	40 015	1,997
<b>Totals</b>	<b>112</b>	<b>11 716</b>	<b>324,235</b>	<b>18 850*</b>

\* In the Report total given as 18,990

In addition to the above general hospitals the *Prison Hospitals* with a total of 339 beds dealt with 5,385 in-patients (28 died) and 72,731 out patients. The *Lunatic Asylum* treated 3 731 patients with 201 deaths and at the *House of Observation* (uncertified persons) 2 629 persons with 87 deaths. In the two *Leper Asylums* 1 115 patients received treatment and 70 died.

Government maintains 674 central and branch *dispensaries* and visiting stations in addition to special institutions for the treatment of out-patients, e.g. tuberculosis eye diseases etc. At dispensaries and out patient departments 6 104 682 patients received treatment the principal diseases being *malaria gastro-intestinal diseases respiratory affections*

Private hospitals maintained on *Estates* numbered 85 and dispensaries 733

The following facts relate to work carried out at selected institutions during the year —

#### *Hospitals etc in Colombo*

*General Hospital*—In patients 29 757 deaths 3 180 out patients 103 644 *Out-patient Clinic Diseases of Women*, 1 020 new patients. *X Ray Dept* 10 137 patients examined. *Ear Nose and Throat Dept.*, new out patients 9 079 *Pathological Dept* examined and reported on 60 457 specimens.

*Dental Institute*.—26,513 new patients

*De Soysa Lying in Home*—9 199 in-patients 5 593 live births 171 maternal deaths. Chief training school for midwives.

*Victoria Memorial Eye Hospital*—In patients 2,836 new out patients 26 066 and 599 children dealt with at School Clinics.

*Lady Havelock Hospital for Women and Lady Ridgeway Hospital for Children*—In-patients 4 401 (women 1 637 children 2,764) deaths 742 (67 women, 675 children) 54 pupils in the training school for nurses.

*Female V.D. Hospital*—In patients 498 one death, out patients 30 156

*Infectious Diseases Hospital*—In patients 3 066 deaths 163.



*Outstation Hospitals*

*Kandy Hospital*—Admissions 15 544 In the Nurses Training school 57 pupils. *Eye Institute* 1 689 in-patients, 11 786 out-patients.

*Galle Hospital*—In patients 12,083, deaths 738. Midwives trained 12. *Eye Institute* 11,340 cases

With regard to *buildings and building requirements* it is noted that a building programme for the next five years has been drawn up and five building schemes itemized. The first stage of the new Nurses Home approaches completion the rebuilding of certain hospitals and the remodelling of others are among matters under consideration.

The following notes briefly summarize the principal items of morbidity experience etc. commented upon in the Report under review

*Malaria* is still the most prevalent disease in the Island, but though in some districts incidence was still high, on the whole recovery from the disastrous epidemic of 1934-35 was satisfactory. The improvement is reflected in hospital returns where it is noted in-patients treated numbered 73 192 as compared with 161,313 in the preceding year, hospital deaths due to malaria 2,030 as compared with 5,340 and out-patients treated at hospitals and dispensaries 2,673 436 as against 8,293 468. In the whole Island malaria deaths numbered 7 620 while under the title *pyrexia* 14,520 deaths were recorded. The distribution of types of infection among in-patients was *benign tertian* 61 077 *quartan* 3 038 *subtertian* 301 *cerebral malaria* 900 and *cachexia* 7 660 there were also 188 cases of *blackwater fever* with 8 deaths. Anti malarial measures continued to be energetically carried out along the lines adopted in previous years (see this *Bulletin* 1935 Supp. p 127\* 1936, Supp. p 133\* and 1937 Supp. p 140\*)

Of *plague* 57 cases with 46 deaths were recorded. 45 of the cases were bubonic and 12 septicaemic. [The figures on page 14 of the Report are not in agreement with those presented in Table IX on page 26.] Thirty-nine of the cases with 33 deaths occurred in Colombo and 14 with 9 deaths in two towns in the Central Province. Rat-flea surveys continued to be carried out at Hatton in the Central Province *X cheopsis* formed 91 per cent. of the collection. Out of 759 rats examined at the Laboratory 61 were positive with *P. pestis*.

Cases of *cholera* numbered 49 and there were 44 deaths due to this cause. 48 of the cases and 43 of the deaths occurred in the Batticaloa District of the Eastern Province. An investigation started in 1931 (but discontinued in 1934) to discover the number of persons harbouring cholera vibrios was reopened during the year vibrios isolated were sent to the Research Institute, Kasauli, for antigenic determination. Three fatal cases of *smallpox* were recorded all occurred in Colombo among Tamils newly arrived from India. Primary vaccinations performed during the year totalled 145 103, of which 129,201 were successful.

*Dysentery* appears to be on the increase and a study is being made of the incidence of the disease. During the year 103 cases with 13 deaths were reported to the Sanitary Branch, and 84 cases were treated in hospitals with 20 deaths. All cases were of the faecial variety and 77 per cent. of them occurred in the Western Province. Deaths in the Island due to *influenza* numbered 1,583, there were 6,806 in-patient hospital cases, and out-patients treated for this cause totalled 177,699

Measles gave rise to 2 775 cases with 2 deaths *whoops* 1 135 cases and 5 deaths and chickenpox 6 768 cases with 12 deaths

Enteric fever cases and deaths reported to the Sanitary branch of the Medical Department were 2,503 and 449 respectively while hospital returns show that 3 048 in patients were treated for the disease and 630 died Of the hospital cases 2,320 were *Bact typhosum* B Records of 269 *Bact paratyphosum A* and 99 *Bact paratyphosum B* infections cases and deaths are unreliable for the majority of cases are said to escape notification (see this *Bulletin* 1937 Supp p 141\*) Of dysentery 3 060 cases and 315 deaths were notified. Hospital in patients numbered 5 179 and deaths 624 Among the hospital cases 3,333 were amoebic and 1 067 bacillary but since the distinction was often made on clinical grounds little value attaches to these figures it is noted that among cases subjected to complete laboratory investigation the bacillary type predominated. Out patients treated for the disease numbered 28 631

For tuberculosis (all forms) 5,357 persons were treated as in patients at the various hospitals etc and 1 177 died no less than 4 449 of the total cases and 1 054 of the deaths were due to the pulmonary form of the disease while deaths in the Island as a whole due to pulmonary tuberculosis numbered 3 167 At the four special institutions for tuberculosis (see this *Bulletin* 1937 Supp pp 141\*-142\*) 1 769 in patients and 3 640 out patients were dealt with It is noted that hospital cases of pneumonia numbered 10 014 and deaths due to this cause 4 069 and cases of bronchitis 6,906 with 323 deaths.

The incidence of cancer appears steadily to increase During the year under review 1 636 cases were dealt with in hospitals and 168 hospital deaths were ascribed to this cause. Cancer deaths in the Island as a whole numbered 580 Of the hospital cases 742 were occurring among members of other races. Cancer of the buccal cavity and female genital organs again predominated (see this *Bulletin* 1937 Supp p 144\*) Among other diseases responsible for hospital in patient treatment rheumatism with 4,234 cases and nephritis with 3 106 cases were prominent

Leprosy.—During the year 1,253 cases were treated at Government hospitals and the two Leper Asylums and 74 patients died The Leprosy Survey was completed in the Western Southern and Eastern Provinces the total area surveyed during the year amounted to about 1,800 square miles with a population of nearly half a million Six new treatment centres were opened and there are now 16 clinics established for the early diagnosis and treatment of the disease It is stated that at the end of the year there were 2,207 known cases in the Island of which 1,910 were Ceylonese

The work of the two Leper Asylums is separately described at some length. At the *Hendala Leper Asylum* 154 patients were admitted 883 treated 62 discharged and 56 died while at the *Manuvu Leper Asylum* 21 lepers were admitted 232 were treated 32 were discharged and 14 died Treatment at these institutions followed along lines previously described (see this *Bulletin* 1937 Supp p. 142\*)

Helminthic Diseases.—The Hookworm Campaign is reported to have made satisfactory progress during the year six additional dispensers

were appointed to the staff. Administrative organization and procedure of the campaign remained for all practical purposes unchanged. Work continues to be described in great detail. During the year 1,855,572 treatments were given those carried out by the various agencies being —

At Government Institutions	..	1,223,850
At Outside Institutions		29,295
By Campaign Dispensers		424,522
Health Units	..	45,255
Mandapam Camp		34,148
Estate Medical Staffs		88,502

Cases treated as hospital in-patients numbered 14,693 and of these 621 died. There were also 2,654 cases of *ascariasis* with 217 hospital deaths, 103 cases of *filaria* with 3 deaths and 267 out patient cases. At the Central Laboratory out of 18,013 faecal specimens examined 79 per cent. contained *hookworm* 75 per cent. *trichuris* and 72 per cent. *ascaris*.

**Veneral Diseases.**—In-patients treated at the various hospitals numbered 7,382, distributed as to 2,258 cases of *syphilis* 4,859 of *gonococcal infections* 5 of *granuloma venereum* and 263 of *soft chancres* these titles in the aggregate were the cause of 80 hospital deaths. Out patients treated at hospitals and dispensaries totalled 28,072.

There are three special V D Clinics in Colombo and one in Kandy and at these centres the following cases were dealt with —

	Syphilis	Gonorrhoea	Other V D	Yaws
General Hospital, Colombo	1,280	1,531	99	10
Port Clinic for Seamen, Colombo	21	19	—	—
Female Branch Hospital, Colombo	277	367	369	—
Kandy Dispensary	97	122	42	8

Although only 18 cases of *yaws* appear to have been treated at the above four clinics 958 cases received treatment as hospital in-patients, and 10,668 as dispensary out-patients.

**Scientific.**—The 32,168 specimens received and examined at the *Bacteriological Institute* included 11,870 samples of blood serum 2,112 of these reacted positively with the agglutinins of *Bact. typhosus* 30 with *Bact. paratyphosus A* and 48 with *Bact. paratyphosus B*. Wassermann tests numbered 7,850 with positive reaction in 1,348 cases. 438 out of 2,971 blood films examined were found to contain malaria parasites. Faecal specimens totalled 3,187 of which 216 contained *Bact. dysenterias* 375 the ova of intestinal parasites and 10 *E. histolytica*. On the other hand it is noted that among 1,922 faecal specimens received for examination from four institutions 176 contained *Bact. dysenterias* and 98 *E. histolytica*.

The 79,687 doses of vaccines prepared and issued included 49,269 doses of T.A.B. vaccines 17,672 doses of gonococcal vaccines 7,779 doses of plague and 3,588 doses of cholera vaccines.

Laboratory work is also carried out at two institutions in Colombo and at nine outstations specimens dealt with at these centres may be tabulated as follows —

	Specimens examined	Positives Malaria	Positives Hookworm
Victoria Memorial Eye Hospital Colombo	7 432	13	19
Lying in Home Colombo	7 012	174	107
9 Outstation Laboratories .. ..	123,237	6 001	21 751

The investigation into the subject of diets and nutritional deficiencies of the local population started four years ago was completed (see this *Bulletin* 1937 Supp p 144\*) The results of the work were published in the *Ceylon Journal of Science* Vol. 4 Part 1 April 1936

The new building for the *Bacteriological Institute* should be completed in 1937

At the *Pasteur Institute* 1 993 persons received preventive inoculation against rabies 938 of them being dealt with as in patients. Brains from dogs and other animals examined during the year numbered 583 of which 253 were positive with Negri bodies

*Division of Medical Entomology*—A comprehensive report describes in detail the work of this Division. Malaria research and control were the main preoccupations of the staff the work carried out at the 25 observation stations in the epidemic and 8 in the non-epidemic zone is described and results recorded. Upwards of 70 lectures and demonstrations on Medical Entomology with special reference to Ceylon conditions to Field Medical Officers Sanitary Inspectors etc. were given

*Scientific Papers* published by members of the staff of the Department of Medical and Sanitary Services included the following —

CHANNUGAN (P. K.) Note on an unusual ophthalmic artery associated with other abnormalities.—*Jour Anat Lond* 1936 July Vol. 70

ELLISON (F. O. B.) Malaria epidemics and sunspot cycles.—*Trans Roy Soc Trop Med Hyg Lond* Vol. 29 No. 6

HILL (W. C. O.) Two examples of infantilism.—*Ceylon Jour Sci* (D) 1936 Aug Vol. 4 Pt. 1

NICHOLLS (LUCAS) A nutritional survey of the poorer classes in Ceylon.—*Ibid*

KARUNARATNE (W. A. E.) (i) Carbon Tetrachloride Cirrhosis in relation to Liver regeneration (with G. R. CAMERON) —*Jour Path Bact* 1936 Vol. 42, No. 1 (ii) The Pathology of Rhinosporidiosis.—*Ibid*

PAUL (M. A.) Surgical measures in Leprosy —*Int Jour Leprosy* 1936.

The following were published in the *Journal of the Ceylon Branch of the British Medical Association* —

BLAZE (J. R.) Nervous Diseases in Ceylon.

FERNANDO (P. B.) A note on the rectal administration of quinine.

FERNANDO (S. E.) Notes on a case of Intraorbital Endothelioma.

GUNAWARDENA (H. C. P.) Tetanus.

JAYASURIYA (J. H. F.) A case of cerebral tumour

KUMARATNAM (I. T.) Notes on a case of Volvulus complicating Pregnancy

LEANAGE (D. T. J.) The incidence of Syphilis.

PAUL (Milroy) Neuro-fibromas of large nerves.

- POKKAMBALAM (C.) Notes on eleven cases of poisoning with "Nachukal."  
 SENARAYANE (I. A.) Balantidial Dysentery  
 SENEYATAMBY (G. S.) Treatment of enlarged prostate in the very aged.  
 WICKREMASINGHE (S. F.) Observations regarding the uses of Atebrin and Quinine in the treatment of malaria.  
 WIJERAMA (E. M.) Notes on two cases of interesting tropical diseases

*Medical Education.*—References to the 1936 Report of the Registrar of the Ceylon Medical College make mention of staff changes and appointments and to the students of various grades on the rolls of the College the relevant facts may be briefly summarized as follows —

*Results of Examinations*

Medical	Sat	Passed	Apothecaries	Sat	Passed	Midwives	Sat	Passed
Pre-medical	79	51	1st Apothecaries	25	15	Class I	41	3
1st Professional	78	45	2nd Apothecaries	53	24	Class II	117	10
2nd Professional	51	37	Pharmacists ..	25	15			
Final —	53	28						

*Concluding Observations Recommendations etc.*—Dr S. T. Gunasekara outlines the policy of rapid expansion of future health work throughout the Island, and emphasizes the importance of the training of necessary personnel if development on intensive lines is to be successfully undertaken in his opinion the Diploma in Public Health should be a *sine qua non* for all Field Medical Officers and facilities should be provided for such officers to obtain the qualification. The provision of adequate minor personnel is necessary to keep pace with developments envisaged. More radical measures for dealing with the plague problem in Colombo should be introduced extensive rebuilding of properties in congested areas where plague is endemic and the establishment of an *Improvement Trust* are among the recommendations made. Further attention requires to be devoted to such matters as soil pollution provision of protected water supplies and the establishment of a training base in the field for malaria control work.

Once again mention is made of the overcrowding of hospitals the recommendations outlined in the 1935 Report are repeated (see this *Bulletin* 1937 Supp. p. 145\*)

*Financial*—Estimated expenditure on Medical and Sanitary Services for the year under review was Rs 10,631,422, while *actual expenditure* amounted to Rs. 10,952,128. The latter sum which represents 10.6 per cent. of the Revenue of the Island during the financial year does not include the cost of new buildings or improvements to and maintenance of existing buildings.

## MAURITIUS (1936)

Mauritius, an island in the Indian Ocean is distant 500 miles from Madagascar 934 from Seychelles 1,300 from Natal and 2,300 from the Cape of Good Hope. It has an extreme length of 39 miles north to south and 29 miles extreme breadth east to west. Its area is about 720 sq miles equal to that of Surrey.

*Vital Statistics*—The mid year population was estimated to number 397,550 persons giving an average density of 552 persons to the square mile. In the nine Districts population densities ranged from 133 in the Black River District to 3,463 per square mile in the Port Louis area. Registered births numbered 13,867 giving a crude annual birth rate of 34.9 per 1,000 population. There were 10,500 registered deaths the death rate being 26.4 per 1,000. It is noted that 9,109 of the total births recorded and 7,461 of the deaths occurred among the Indian population in the Colony.

Of infant deaths 1,973 were recorded giving an infant mortality rate of 142 per 1,000 births as compared with a rate of 139 in 1935. Of the total infant deaths 910 were ascribed to *diseases of early infancy*, 390 to *infectious and parasitic diseases*, 310 to *diseases of the digestive system* and 265 to *respiratory affections*. The causes of infant deaths are discussed at some length in this section of the Report. Stillbirths registered during the year under review numbered 1,321 and of these 1,021 occurred among the Indian population.

*Maternity and Child Welfare Work*—For a full account of these activities the reader is referred to the 1937 issue of this *Supplement* p. 146\*. The two Societies the Maternity and Child Welfare Society and the Goutte de Lait continued to function with success and were afforded the usual financial support by Government. Eight qualified *Midwives* employed by the Government attended 937 confinements and paid 4,368 home visits. Colony Hospitals treated 1,878 women in patients for conditions associated with the puerperal state, and of this total 1,149 were labour cases. In the Colony as a whole 145 deaths were ascribed to the puerperal state giving a maternal mortality rate of 9.6 per 1,000 births.

*School Hygiene*—Information which can be included under this heading appears to be confined to the announcement that Dr H. ANDRÉ M.B.E. working on limited Health Centre lines in the District of Pamplemousses examined 1,671 school-children and discovered 292 of them with enlarged spleens. In the four areas visited spleen rates ranged from 3.8 to 32.3 per cent.

*Public Health Sanitation etc*—In the Port Louis area the steady progress made in the extension of the sewerage system is causing a reduction in the number of pail services which have to be maintained. In Curepipe an increasing number of householders desire the installation of a water-carriage system to replace the existing pail service. The demands are receiving the consideration of the authorities. In most rural areas, pit latrines are prescribed and in some parts the leaching cess-pit connected with a water-closet has been approved.

With regard to *water supplies* it has been said that the cause of the growth of *Beggiatoa alba* in the collecting chambers of the Mare-aux-Vacoas filtering plant (see this *Bulletin* 1937, Supp. p. 147\*) has been

discovered and a remedy provided through the investigations of Mr L. WEBB of the Bacteriological Laboratory an account of Mr Webb's work is given in the Bacteriological Report. Other supplies remain as previously described (see this *Bulletin* 1937 Supp. p. 147\*) it is added that no outbreak of disease attributable to water-borne infection was recorded during the year. *Anti-malarial* work continued to be actively dealt with existing drains, channels and other effective works were maintained and supplies of totaquina were distributed as widely as possible. The work is described in detail in the *Annual Report of the Malaria Branch* which appears as an Appendix to the Report under review.

The *general health of labourers* whether resident on estates or living in their own homes is reported to have been satisfactory. During the year an attempt was made to ascertain the state of *nutrition* of the labouring classes. Government Medical Officers assembled from typical households data concerned with monthly income and expenditures on rent, food clothing etc. the data being later subjected to detailed analysis. Though some difficulty was experienced in collecting complete and reliable facts, results suggested that malnutrition was rare. While this enquiry was proceeding the Department was also engaged in devising suitable dietaries which the agricultural labourer could provide out of average income. Details of the steps taken to achieve this object are discussed and hypothetical diets are presented in an Appendix to the Report under review. The references to *foods and drugs in relation to health and disease* remain unchanged (see this *Bulletin* 1936 Supp. p. 142\* and 1937 Supp. p. 147\*).

With regard to the *training of sanitary personnel* it is noted that the six candidates whose training began in 1934 qualified during the year for admission to the sanitary branch (see this *Bulletin* 1937 Supp., p. 147\*).

*Port Health Work*—This section of the Report states that 238 vessels arrived during the year 3 617 passengers and 20 470 members of crews were examined while 80 vessels arriving from infected ports were disinfected and fumigated. The Medical Officer of Health, Port Louis describes the arrangements governing the storage of grain in rat-proof granaries. Sanitary surveillance over the harbour and adjacent areas of the town was continued the rat destruction gangs also worked systematically outside the zone of surveillance and trapped 8,832 rats.

*Hospitals Dispensaries etc.*—Patients treated in the various Hospitals numbered 27,573 as compared with 27,908 in the preceding year. The distribution of these patients amongst the various institutions is shown in the Table on p. 133\*.

New out-patients treated at the various *out-patient departments and dispensaries* are stated to have numbered 206,369 though it is added that the figures must be accepted with reserve as they probably include a number of attendances of the same patient attendances recorded for treatment totalled 287 486.

It is again observed that the *nursing establishment* of the hospitals is below a reasonable minimum recruitment presents great difficulty as suitable candidates are not coming forward in sufficient numbers to meet normal wastage.

Institution	Beds	Admissions	Total Treated	Deaths
Civil Hospital	295	8 140	8,296	426
Long Mountain Hospital	59	1 697	1 721	93
Poudre d Or Hospital	70	1 666	1 681	43
Flacey Hospital	88	2 131	2 135	115
Mahebourg Hospital	106	3 079	3 132	188
Souillac Hospital	103	2 151	2 179	95
Victoria Hospital	254	5 750	5,883	312
Moka Hospital	77	1,546	1 574	82
Port Louis Prison Hospital	16	296	289	0
Beau Bassin Prison Hospital	32	334	348	
Mental Hospital Infirmary	64	183	202	
Barkly Industrial School Hospital	12	149	149	
Totals	1 175	27 122	27,573	1,399

There were 39 *Estate Hospitals* in the Colony in 1936 no details of the work of these institutions are supplied.

The principal causes of sickness dealt with at hospitals and dispensaries are commented upon at varying lengths in the Report these are briefly referred to in the notes which follow —

*Malaria admissions* to Colony Hospitals during 1936 numbered 3 048 or over 10 per cent. of the total admissions for all causes of sickness. Hospital deaths due to malaria numbered 105 and deaths in the Colony from the disease 2,282 equal to a rate of 5.7 per 1 000 persons living. Total cases treated as in-patients were 3 076 and among them appear 28 cases of *blackwater fever* with 9 deaths and among them types of infection among the remainder of the patients being *benign tertian* 1,846 *subtertian* 41 *quartan* 202 *cachexia* 768 and unclassified 191. A sharp outbreak occurred at Moka the *Malaria* Branch was informed of this on the 4th of January but it was clear the outbreak must have been smoldering for some time previously and suddenly taken to have exhibited explosive violence. Special steps were taken to deal with the outbreak which continued until the middle of March thereafter no new cases being reported from the affected area. The numbers of cases dealt with are not given but out of 834 blood films examined during the first four months of the year 169 were *benign tertian* infections 79 *subtertian* and 11 *quartan*. Dr L. J. Mcgregor describes this outbreak in his Annual Report of the Malaria Branch.

Among 158 blood films examined at the Bacteriological Laboratory 31 contained *P. citra* 20 *P. falciparum* and 107 gave negative results.

No case of *plague* occurred during the year. plague-preventive work has been the subject of brief mention in the section dealing with *Port Health* above. There has been no *smallpox* in the Colony since 1918 during the year under review 10 055 children were vaccinated. Of *diphtheria* 28 cases were notified 13 were treated as hospital in-patients and 2 died. At the Laboratory where 171 throat and nasal swabs were cultured 12 were positive with *C. diphtheriae* the organism was also isolated in 14 out of 67 specimens microscopically examined.



Cases of *enteric fever* notified numbered 78 but it is added that these figures give little indication of the actual prevalence of the disease in the Colony. Hospital returns show 43 cases of typhoid and 2 of paratyphoid A among in-patients with 16 deaths and 6 out-patients cases of typhoid. Among 231 samples of sera submitted for specific agglutination tests at the Laboratory 91 agglutinated *Bact. typhosum*, 2 *Bact. paratyphosum A* and 2 *Bact. paratyphosum B*.

Dysentery of the bacillary type has an epidemic tendency. Localized outbreaks occur from time to time but it is said that by the time such outbreaks have been notified to the authorities much damage has been done rendering restriction of the spread of the disease more difficult. Hospital returns show that 869 in-patients were treated and that 52 died, and that 4,334 out-patients were dealt with. The distribution of types of infection among in-patients reads amoebic 463 cases bacillary 268 and unclassified 138, the corresponding figures for out-patients being 3,415 101 and 818 respectively. It is to be noted (a) that the recorded figures are not to be regarded as an accurate index of the incidence of the disease for many cases are never seen by a doctor and numerous ambulant cases also escape notification, also (b) the distinction between types of dysenteries in the returns are likely to be inaccurate as laboratory diagnoses are not always possible thus distinctions may have been made on clinical grounds only. At the Laboratory where cultural examinations were carried out on 17 faecal specimens, 2 contained *Bact. dysenteriae* Shiga and one Flexner 1. also 1,073 faecal specimens were microscopically examined and 59 of these were positive with *E. histolytica*.

Respiratory affections claim a heavy toll of deaths in the Colony and come second to malaria as a cause of mortality. During the year 1,735 deaths were ascribed to this group within which the pneumonias were responsible for 1,215 deaths. In-patients treated for broncho- and lobar pneumonia numbered 636 and 170 died, while 367 out-patients were treated for these causes. There were 816 cases and 32 deaths among in-patients treated for acute and chronic bronchitis and no less than 5,481 out-patients were treated for the disease. In the Colony as a whole 300 deaths were ascribed to tuberculosis (all forms) among 575 hospital in-patients treated for the disease, with 71 deaths. 476 of the cases and 67 of the deaths occurred among patients suffering from the pulmonary form of the disease, while among 1,734 tuberculous out-patients 1,328 were pulmonary cases. At the Laboratory where 338 specimens of sputum were examined 81 contained *Myc. tuberculosis*.

*Helminthiasis*.—Cases of *ankylostomiasis* treated in hospitals and dispensaries totalled 21,570 and of these 2,138 were in-patients 61 of whom died. The *Annual Report of the Hookworm Branch* compiled by the Senior Medical Officer in charge of the campaign is printed as an Appendix to the Report under review. A new survey of the Plaines Wilhems District was carried out. 2,028 persons were examined and 864 or 44 per cent were found to be infected. the diminution in the rate as recorded in the 1929-1930 survey (viz. 50.7 per cent.) may be considered negligible but improvement in the heaviness of infection is said to be marked. Altogether 5,187 persons were examined in the Colony during the year 1,819 were positive for hookworm, 2,538 for ascaris and 3,407 for trichocephalus. treatments totalled 84,683.

As regards *schistosomiasis* it is said that no work in this connexion could be undertaken owing to shortage of laboratory staff. It is noted however that 45 hospital in-patients and 253 out-patients were treated for this condition. At the Laboratory where 351 samples of urine were microscopically examined 20 contained *S. haematobium*.

*Cestode infection* is not regarded as of great public health importance in the Colony. Among hospital in-patients 4 were treated for *taeniasis* 160 for *ascariasis* and 2 for *dracontiasis* while among out patients there were 6 109 cases of *ascariasis* and 3 of *taeniasis*. Among 1 073 faecal specimens examined at the Laboratory 658 contained *Trichuris ova* 193 *ascaris* 417 *ankylostome* and 4 specimens of *T. saginata* were recorded.

The Annual Report of the *Leper Board* and *Leper Hospital* contributed by Dr H. ANDRÉ Medical Superintendent of the Leper Hospital, appears as an Appendix to the Annual Medical Report for 1936. During the year 9 lepers were admitted 6 died, and 3 were discharged leaving 49 inmates resident in the Leper Hospital at the end of the year. Of each of the latter patients brief notes are appended with regard to sex age type of leprosy duration of the disease condition etc. The stools of patients were examined and heavy hook-worm infestation was recorded. Treatment resulted in noteworthy all round improvement.

*Veneral diseases* treated during the year were as follows. In-patients 203 cases of *syphilis* 132 of *soft chancres* and 258 *gonococcal infections* the corresponding details for out-patients read 1 098 284 and 1,354 respectively. Facilities for the treatment of merchant seamen are provided at the Civil Hospital, Port Louis within easy reach of the harbour. At the Laboratory where the Kahn test is employed in the routine serological diagnosis of *syphilis* 3,377 samples of blood serum were dealt with 2 041 gave negative 208 doubtful and 1 040 positive reactions while 88 were found unsuitable for test. Out of 82 samples of pus etc. 18 contained *N. gonorrhoeae*.

*Other diseases* referred to include *erysipelas* of which 73 cases were notified as compared with 85 in the preceding year. Hospital in-patients treated for this cause numbered 72, and of these 8 died, while in addition there were 15 out-patients. Hospital admissions for *malignant disease* numbered 187 cases treated as in patients 190 and deaths 23. Deaths in the Colony as a whole ascribed to this cause totalled 66.

*Scientific*—The Annual Report of the Bacteriological Laboratory observes that despite serious shortage of staff and the consequent extra pressure of work devolving upon remaining personnel, the usual routine examinations were dealt with uninterruptedly though research work suffered considerably. The total number of specimens received was 6 618 as compared with 9,269 in the preceding year. The decrease is due to the cessation of the examination of cattle bloods for trypanosomes upwards of 3 000 of which were dealt with at the request of the Department of Agriculture in 1935. The more important of the specimens received and examined and findings recorded have been the subject of brief mention in the preceding notes under such headings as *water supplies malaria diphtheria enteric dysentery*.

*tuberculosis helminthiasis venereal diseases* making repetition unnecessary

The Government Analyst reports that 1,660 samples were received and examined from the Medical Department and other official sources. Monthly chemical examinations of the Port Louis and of the Mare-aux-Vacoas water supplies were carried out as usual. Samples of the Port Louis supply were of uniformly good quality but during the summer months a certain degree of vegetable contamination occurred in the Mare-aux Vacoas supply certain structural alterations to the exit chambers of the filter beds effected a big improvement (see *water supplies* in the section *Public Health* above)

Mention has already been made of the fact that no large scale research work could be carried out owing to depletion of staff it was impossible to continue the work of Dr A. R. D. ADAMS on the vector of *bilharzia* in Mauritius while the studies of the incidence of *Trypanosoma evansi* and *T. vivax* in cattle and horses had to be set aside temporarily. Small problems emerging from routine examination work were however taken up and investigated. Mr L. WEBB examined 336 samples of stools and endeavoured to discover the percentage infection of the inhabitants of Mauritius with *Trichostrongyle* his findings showed 88.5 per cent. contained *N. americanus* ova 8 per cent *Trichostrongyle* 0.9 per cent. *T. denmanius* and 0.8 per cent *A. brasiliense* ova. The same worker investigating urines among other findings recorded organisms biochemically resembling the metadysentery bacilli of Castellani (1927) a fuller account of these works is to be published.

Among scientific papers published during the year the following are noted —

MCGREGOR, L. J. The Significance of the Butterfly Sign and of Tongue Pigmentation.—*Trans Roy Soc Trop Med & Hyg* Vol. 30 p. 229

GILBERT S. The Breeding of *A. costalis* in seawater in Mauritius.—*Trans Roy Soc Trop Med & Hyg* Vol. 30 p. 365.

With regard to the *Special Reports* contained in the Annual Report under review those of the Bacteriological Laboratory, Government Analyst Hookworm Branch Malaria Branch, and Leper Hospital, have already been noted and it remains to refer briefly to four others.

*Port Louis*—Estimated population at the middle of the year was 55,494 the birth-rate 38.7 death rate 27.4 per 1,000 population and infant mortality rate 205.3 per 1,000 births. The connexion of more premises to the sewerage system led to the abolition of a further 82 pail services.

*Rodrigues*—Progress in regard to water supplies and general sanitation is reported. Population at the end of the year 10,072, birth rate 40 and death rate 7 per 1,000 population infant mortality rate 51.5 per 1,000 births. To the Port Mathurin Hospital 299 patients were admitted and 12 died dispensary patients numbered 7,771. Three cases of *malaria* were treated—all were infected in Mauritius (see this *Bulletin* 1937 Supp. p. 150\*). There are 23 lepers in the Dependency.

*The Report on the Mental Hospital* states that at the end of the year there were 949 certified insane persons in the Colony of these, 740 were patients in the Mental Hospital.

*The Report of the Radiologist describes the year's work in the X-ray Department at the Victoria Hospital.*

MAURITIUS—  
SEYCHELLES (1936)  
Financial—Total expenditure on Medical and Sanitary Services during the year under review amounted to Rs. 1,568 076 a sum which represents approximately 10 per cent of the revenue of the Colony during the same period.

**SEYCHELLES (1936)**

The Seychelles Islands 92 in number are situated in the Indian Ocean between 4 and 10 S latitude. Their total area is estimated as 156 sq miles. Mahé the largest, is 17 miles long and 3 to 7 broad with an area of 56 sq miles.

**Vital Statistics**—The estimated population at the end of the year is given as 30 461. Registered births numbered 877 and deaths 354 the resulting crude birth and death rates being 28.8 and 11.6 per 1 000 population respectively. Infant deaths numbered 49 and the infant mortality rate 55.9 per 1 000 live births as compared with a rate of 91.6 in the preceding year. Registration in the Colony is compulsory and complete (see this *Bulletin* 1937 Supp. p. 151\*).

Neither the numbers of Government Officials nor of the General European population are given but one European death is recorded and it is stated that 632 Officials from various Government Departments were treated at Headquarters in Victoria during the year. Officials treated by Assistant Medical Officers in the Districts are not included in these figures.

**Maternity and Child Welfare Work**—In the Maternity Section of the Seychelles Hospital 241 women were treated for conditions associated with the puerperal state and of these 192 were normal labour cases with 181 live births and no maternal deaths. Ante-natal and infant welfare clinics are held at this hospital three times a week. The certificated midwife and nurse continued to act as Lady Health Visitor and during the year she made 301 visits to poorer class homes. These visits have become increasingly popular but again it is pointed out that a single Lady Health Visitor is unable to cope with the volume of work concerned with this service (see this *Bulletin* 1937 Supp. p. 151\*).

The Seychelles Hospital is the centre for the training of probationary nurses for the Registered Diploma in Medical and Surgical Nursing and Midwifery. In the Maternity Section of the Cottage Hospital Praslin 40 normal labour cases were dealt with controlled by Government and two secondary schools assisted and Government Officers who during the year examined to be carried out by Medical Officers. Periodical inspections continued over 2 000 children in the various schools of Mahé. No details of the results of these examinations are given but it is said that the health of the children was far though cases of dental caries, helminthic infestation and malnutrition were frequently met with. The former inadequacy of latrine

accommodation seems to have been made good. The Medical Officer of Praslin La Digue carried out a survey of all schools in his district with the following results —

	Praslin	La Digue
Total number of children examined	368	178
	Per cent.	Per cent.
Lack of cleanliness	12.6	4.0
Deficient nutrition and development	8.8	11.0
Defective teeth or dental caries	10.6	10.3
Intestinal parasites	25.6	27.5
Tonsils and Adenoids	9.3	7.3
Diseases of respiratory system	2.8	7.0
Diseases of circulatory system	2.1	1.0
Eye defects	8	—
Sum diseases	10.0	10.0

The teaching of elementary hygiene in all grant-in-aid schools is compulsory and in many schools physical exercises are an item in the curriculum.

*Public Health Sanitation etc.*—The health of the population is described as "fair throughout the year". At the change of the monsoons common colds generally accompanied by fever bronchial and laryngeal catarrh are prevalent. The health of the community would greatly benefit if more hill stations were available where people could reside during the hottest month of the year yet still be within convenient reach of their daily businesses. Suitable country is impracticable at present owing to lack of a motor road.

The responsibilities of the Victoria Town Board and local Boards of Health and methods of *sewage and refuse disposal* remain as previously described (see this *Bulletin* 1936 Supp. p. 148\* and 1937 Supp. p. 152\*). It is pointed out that the open gutter system of surface drainage where inadequate in certain rural districts, permits pools to accumulate after heavy rains to become good breeding places for mosquitoes (see also *Malaria* below).

*Water supplies* are adequate and free from pathogenic organisms. a river ranger is considered necessary to patrol water reserves and to supervise catchment areas to ensure freedom from pollution of sources of supply.

The arrangements made for the inspection of foods etc. exposed for sale continued throughout the year (see this *Bulletin* 1937 Supp. p. 152\*). The bulk of the population are rice-eaters and the value of vegetables and fruits is said not to be fully appreciated. Cases resulting from a lack of anti-neuritic vitamins in the diet are frequently seen. Labourers the bulk of them of African descent are mainly engaged in agricultural work. there are about a 1 000 of these workers, whose lot is on the whole said to be a happy one and their health generally good.

The training of auxiliary personnel is undertaken by the Medical Officers and instruction given in all subjects necessary for the performance of various duties.

*Recommendations for future work* include one concerned with the provision of more adequate accommodation at the Quarantine Station.

Long Island and another which presses for the adoption of a housing and town planning scheme for dealing with congested areas in Victoria.

*Port Health Work*—The constitution of the Port Sanitary Authority remains as described in these pages a year ago. During the year 54 ships entered Mahé and 563 passengers arrived in the Colony. (Of the latter 425 were saloon passengers an indication of the development of the tourist industry.) No ships were placed in full quarantine during the year six sailing vessels were fumigated and fumigation of cargo from larger vessels was carried out on 35 occasions.

*Hospitals Dispensaries etc*—The work carried out at various Government Institutions may conveniently be tabulated as follows—

Institution	Admissions	Treated	Died	Out patients
Seychelles Hospital, Victoria	1 189	1,221	26	4 074
Cottage Hospital Praslin	165	?	3	1 659
Lunatic Asylum	6	34	2	—
Pauper Asylum	51	?	34	—
South Mahé Dispensary	—	—	—	2,153

The notes which follow summarize the references contained in the Report under review to the principal diseases dealt with during 1936.

*Malaria* does not exist in the Colony but the potential danger of its introduction is seen from the fact that six imported cases were treated in hospital during the year. As a preventive measure all vessels trading between the Colony and adjacent malarious countries are subjected to careful inspection and fumigation (see this *Bulletin* 1937 Supp. p 152\*). *Dengue fever* occurs in sporadic form throughout the Colony and five cases were admitted to hospital during the year. Cases of *elephantiasis* of the legs are not uncommon while many cases of *lymphadenitis lymphangitis* and *hydrocele* are of undoubted *filarial* origin.

No case of *smallpox* occurred or was imported during the year. Every child is required by law to be vaccinated before the age of nine months all labourers proceeding to outlying islands must be re-vaccinated prior to their departure and all passengers entering the Colony from countries where *smallpox* is endemic must produce a medical certificate testifying that they were vaccinated not less than 12 days and not more than 3 years prior to embarkation. During the year 761 children were vaccinated by Government Medical Officers. Twenty cases of *amoebic dysentery* were treated at the Seychelles Hospital and two at the Cottage Hospital Praslin no deaths were recorded as due to the disease. There were 13 non fatal in patient cases of *influenza*.

Out of 17 cases of *tuberculosis* (all forms) treated as in patients 15 were suffering from the *pulmonary* form of the disease. *Pulmonary tuberculosis* is a principal cause of mortality in the Colony and during the year 28 deaths were ascribed to this cause. Other *respiratory* affections dealt with among hospital in patients were 23 cases of *asthma* 11 of *bronchitis* and 10 of *pneumonia*. 15 deaths were registered in the Seychelles as due to *pneumonia*.

The most common *helminthic diseases* met with in the Colony are *ankylostomiasis* and *ascariasis* though *T. trichuris* and *E. vermicularis* infestations are also said to be prevalent (see this *Bulletin* 1937 Supp. p. 153\*). *Ankylostomiasis* continues to be commonly met with amongst the natives and poorer classes and so long as these people continue to pollute the soil with their excrement hookworm infections and re-infections are inevitable. Mass treatment was carried out in 17 centres and 13 794 persons were dealt with.

The incidence of *leprosy* is high for a Colony of the size of the Seychelles. At the beginning of the year there were 83 known lepers and six new cases of the cutaneous type were discovered during the year of the recorded cases. 47 were segregated in the Leper Asylum, 50 in their own homes, one died and one was discharged on parole. Parole cases are re-examined every three months. Following the completion of a post-graduate course in leprology in Calcutta, Dr P. M. JOSEPH carried out a partial leprosy survey in certain areas. In the course of this enquiry three new cutaneous and two early nerve cases of mild type were discovered in the islands of Praslin and La Digue, and two new cutaneous cases were found in the central district of Victoria. Towards the end of the year Government took possession of the Island of Curieuse where a modern leper colony will be established (see this *Bulletin* 1937 Supp. p. 153\*). It is hoped that in course of time voluntary isolation in pleasant surroundings will replace the present unsatisfactory system of compulsory segregation. Patients at present segregated at their homes attend for treatment at weekly intervals at the leprosy clinic held in Victoria. At the Settlements it is stated that though early neural cases improve under treatment, no cutaneous case has so far become bacteriologically negative.

*Veneral Diseases*.—The clinics are held at the centres previously described (see this *Bulletin* 1937 Supp. p. 153\*) and are well attended. These diseases are said to be "very prevalent" but no dependable figures are available. For medical treatment is only sought after several brands of native medicines have been tried and proved worthless. Syphilis is usually of a milder type than that seen in Europe, but complications of gonorrhoea are very common and lymphogranuloma inguinale frequently met with. Hospital inpatients treated for venereal diseases numbered 35, of which 24 were cases of gonorrhoea and its complications.

With regard to *other diseases* mentioned in the Report it is noted that 10 deaths were ascribed to cancer in the Colony during 1936, while 15 non-fatal cases of the disease were treated in the Seychelles Hospital. Diseases of the arteries and circulatory system, many of syphilitic origin, are responsible for the largest number of deaths, while *rheumatic affections*, especially those arising as complications of gonorrhoea, are common. Hospital returns show 43 inpatient cases of acute and sub-acute hepatitis, 38 cases of appendicitis and 34 of hernia.

Appendices to the Annual Report under review comprise Annual Medical Reports of (a) The Assistant Medical Officer, South Mahé and (b) The Assistant Medical Officer, Praslin and La Digue. Both these supplementary reports are presented in considerable detail.

*Scientific*.—At the Hospital Laboratory the usual routine examinations are carried out, but it is added that existing equipment permits only the simplest kind of bacteriological examination. No

details are supplied. Provision is being made to provide up-to-date equipment and to place the laboratory under the charge of an adequately trained officer.

*Financial*—Medical and Sanitary expenditure during 1936 amounted to Rs 99 603 an excess of actual over estimated expenditure of Rs. 22,801. This excess is explained by the fact that Rs 22,500 was paid to the lessees of the Island of Curieuse as compensation for early termination of their lease in order that the Island might be used for the establishment of a modern leper colony (see *Leprosy* above)

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## FAR EAST

### BRITISH MALAYA.

*Introductory*—The year 1936 saw published for the first time under one cover the Annual Medical Reports for the Straits Settlements and the Federated Malay States this action constituting the first step towards a Pan Malayan Medical Report for the time is not yet ripe for the inclusion of the Reports of the Non Federated Malay States. The Report under review contains a series of admirable illustrations of phases of medical life and work in Malaya.

The reader may be reminded that in 1932 the staffs of the Straits Settlements and Federated Malay States Medical Services were amalgamated to form the Malayan Medical Service under the Director Adviser (see this *Bulletin* 1934 Supp. p 123\* and 1935 Supp., p 145\*) Officers of the Medical Service are liable to serve either in the Straits Settlements or in the Federated Malay States. In order to facilitate reference to corresponding summaries published in previous issues of this *Supplement* it is proposed to follow former practice by discussing the respective areas separately as hereafter

### FEDERATED MALAY STATES (1936)

The Federated Malay States are situated on the mainland of the Malay Peninsula, closely connected with the Straits Settlements. They comprise four States—Perak, Selangor, Negri Sembilan and Pahang. The total area is 77,848 sq miles. The principal towns are Ipoh, Taiping, Kampar and Teluk Anson in Perak, Kuala Lumpur and Klang in Selangor and Seremban in Negri Sembilan.

*Vital Statistics*—The mid year population estimated by the balancing equation method was 1,847,801. It is stated that the excess of immigration over emigration had considerably less influence on vital statistics during the period under review. The racial distribution of the population reads as follows—

State	Malays	Chinese	Indians	Non Asiatics	Others	Totals
Perak	334,683	34,151	168,768	1,032	6,450	539,083
Selangor	137,116	280,256	184,842	3,404	8,967	573,775
N. Sembilan	96,402	97,750	81,481	1,085	3,155	249,853
Pahang	119,456	55,920	14,880	474	1,391	192,230
Totals	687,657	761,077	400,080	8,185	20,972	1,847,951

*Registered Births* numbered 71,504 giving a crude birth-rate of 38.7 per 1,000 persons. The increase in the birth-rate is shared by all races but is most marked for Malays the rates reading Malays 43.4 Chinese 38.5 Indians 33.3 Non Asiatics 14.9 and Others 9.1 respectively.

Registered deaths numbered 35,528 with a crude death rate of 19.2 per mille. The distribution of death-rates by race shows that the highest rate 21.5 per 1 000 occurs among Malays then in descending order appear Chinese 18.5 Indians 18.0 Others 5.6 and Non Asiatics 3.4

The Infant Mortality Rate shows a further decline from 144 per 1 000 births in 1935 to 142 per 1 000 in 1936. The improvement in Infant Mortality among Malays in Perak during 1935 was not maintained for during 1936 the rate rose to 162 per mille a localized rise which cannot be explained for a decrease is recorded for Malays in all other States. Chinese in Perak record the lowest rate of 123 per 1 000 and are followed by Indians in Selangor and Malays in Negri Sembilan each with a rate of 129 per 1 000 births.

The numbers of labourers on estates were less than in previous years viz 159 431 the distribution of the labour force by States and the corresponding deaths and death-rates are set out in the following Table —

State	Labour Force	Deaths	Death Rates
Perak	51 713	347	6.7
Selangor	57,716	351	6.1
N. Sembilan	87,290	298	8.0
Pahang	12,712	114	9.0
Totals	159 431	1 110	7.0

*Maternity and Child Welfare Work*—At all Government Hospitals provision is made for dealing with maternity cases. Maternity Wards are reserved for Malay women at the General Hospital Kuala Lumpur and there are also Maternity hospitals supported by the Chinese Communities in Selangor Perak and Negri Sembilan. Official Returns record 8,836 cases treated for conditions associated with pregnancy childbirth and the puerperal state and of these 7 146 were normal labour cases. The Training of Midwives was continued in all the four States at Government Hospitals the majority of trainees are Malays with Chinese at the Chinese Maternity Hospitals. The successful candidates are posted to selected kampongs where infant mortality is highest it is stated that trained midwives are gradually eliminating the untrained *bidans* throughout the States but there is urgent need for better midwifery amongst the Tamil population.

There are 16 Infant Welfare Centres distributed as to 3 in Perak 9 in Selangor one in Negri Sembilan and 3 in Pahang these centres are controlled either by a Lady Medical Officer or by a Health Sister with Health Visitors and trained midwives (see this Bulletin 1937 Supp. p. 156\*) Custom and prejudice are gradually being overcome and Malay women are attending the Clinics in increasing numbers.

*School Hygiene*—Schools are regularly visited by Health Officers Lady Medical Officers and Health Inspectors and pupils medically examined. During the year under review 1,301 visits were paid to 685 schools 57,214 children were examined and the principal findings expressed as percentages of total defects noted recorded as follows —

Defect	Perak	Selangor	N. Sembilan	Pahang
Dental diseases ..	28.0	33.59	63.78	47.35
Skin diseases	5.5	7.66	18.36	10.66
Eye defects	0.2	1.23	2.63	2.53
Spleen enlargements	6.6	1* 7	11.69	9.71
Pedicularous	9	7.23	12.56	2.17

Hygiene is taught in all schools and teachers are required to pay particular attention to the health and cleanliness of their pupils.

The Senior Dental Surgeon treats children of school and pre-school age at his Kuala Lumpur clinic and also visits children in schools and kampongs in rural areas. Towards the end of the year an additional Dental Officer was appointed in Perak.

*Public Health Sanitation etc*—It is said the general health of the community during 1936 showed no unusual features. No new constructional works of any magnitude were undertaken.

There is nothing new to record with regard to the methods of sewage disposal (see this *Bulletin* 1936 Supp. p. 153\*) except perhaps to add that in suitable localities, particularly in villages every opportunity has been taken to extend the effective method of sewage disposal by the use of tube latrines. Water supplies are generally satisfactory, bacteriological and chemical tests show a high standard of purity though again it is noted that the purity of the water at Pekan is below standard (see this *Bulletin* 1937 Supp. p. 157). A new purification plant was brought into use at Kuala Pilah, Negeri Sembilan in May and has proved very satisfactory.

*Housing and Town Planning* matters receive close attention and the work of demolition of insanitary dwellings and slum clearance was continued in the large towns. Routine house-to-house inspections are carried out regularly in all Sanitary Board areas, and progress is reported in dealing with overcrowded areas, ventilation and general sanitation.

*Estates and Mines* were regularly visited by Officers of the Health Branch usually with the willing co-operation of estate and mine authorities who realize the economic value of improved health conditions on their properties. The death rate of labourers showed a slight increase but this is attributed to some extent to the low powers of resistance possessed by new immigrants (see above *Vital Statistics*). Health Officers continued their visits and supervision of labourers in the employ of Government: the general health of these was reported to be satisfactory. The Railway Health Officer and his staff are responsible for health conditions of the F.M.S. Railway and for the medical treatment of all railway employees: during the year 23,676 patients were dealt with.

The close supervision of Health Officers of restaurants, food factories, dairies etc. continued to be exercised. Though all dairies and milk sellers are licensed, adulteration is frequently practised, and it is stated that on the whole the conditions under which milk is supplied are still unsatisfactory.

The measures taken to spread knowledge of hygiene and sanitation remain as described in these pages a year ago. Health education

films attract good audiences and the policy of Health Inspectors visiting and lecturing in kampongs is achieving success.

The training of Sanitary Personnel was continued at Singapore (see this Bulletin 1937 Supp p 158\*) Three candidates were sent from Perak to take the course three appeared for re-examination and two were successful. In Selangor two probationary sanitary inspectors are under training prior to taking the course at Singapore.

The various legislative measures enacted during the year in the interest of public health dealt with such matters as Sanitary Boards, Mental Diseases, Quarantine Medical Registration and Deleterious Drugs.

**Port Health Work**—Ocean going vessels entering and clearing from Port Swettenham during 1936 numbered 2 053 and there were also 920 other vessels dealt with exclusive of native craft. The Port Health Officer examined 38 506 passengers and 12 439 members of crews. 30 immigrant vessels arrived from infected ports all immigrants on board being quarantined for a scheduled period. Eight pilgrim ships passed through the port but no pilgrims embarked or landed. The examination of immigrants for signs of leprosy was continued and among 9 482 persons examined 46 cases of leprosy were discovered and 39 patients repatriated. Immigrants are also examined for signs of recent vaccination and where such signs are absent are revaccinated. 1,973 vaccinations were performed under this regulation.

**Hospitals Dispensaries etc**—An increase in the number of admissions to hospitals is recorded viz 88,551 as compared with 92,353 in the preceding year. The racial distribution of patients reads Chinese 33 621 with 4 072 deaths Indians 52 731 with 2,870 deaths Malays 9,807 with 219 deaths and Others 2,392 cases and 100 deaths. In patients and out patients treated at Hospitals Dispensaries etc in the four States were as follows—

State	Hospitals	Beds	Admissions	Deaths	Out-patients
Perak	13	2,312	43,308	3,337	289 171
Selangor	7	1 475	25,846	1,917	219 129
N. Sembilan	6	968	15 780	1 184	105 795
Pahang	7	635	13 617	813	120 465
Totals	33	6 433	88,551	7,261	714,560

Of the total out-patients treated 232 111 were dealt with at Stationary Dispensaries and 203,247 by Travelling Dispensaries the number and distribution of these out-patient treatment centres being—

Item	Perak	Selangor	N. Sembilan	Pahang
Rural Dispensaries	19	12	4	8
Travelling Dispensaries (Motor)	8	4	5	4
Travelling Dispensaries (River)	2	—	—	1
Motor Boats ..				

The prevailing diseases amongst in patients were malaria respiratory affections venereal diseases the notes which follow summarize the textual commentaries contained in the Report under review

Though *malaria* figures remain high both incidence and mortality are lower than in the preceding year. Hospital admissions for this cause totalled 20,344 and of these diagnosis was confirmed by microscopic blood examinations in 15,317 cases the findings being *subtertian* infections 64.6 per cent. *benign tertian* 28.7 *quartan* 2.3 and *mixed* infections 4.4 per cent. Deaths ascribed to *malaria* numbered 915 and to *undefined fevers* 12,456. hospital deaths due to *malaria* numbered 627 there were also 12 cases of *blackwater fever* with 3 deaths.

Among 280,920 blood films examined at hospital laboratories 28,970 were found to contain *malaria* parasites, 17,271 being *subtertian* 9,953 *benign tertian* 804 *quartan* and 937 *mixed* infections.

There was an increase of *malaria* in the coast district of Selangor the infection being due to *A. sundensis*. It is reported that anti-malaria measures in the rural areas are hindered by lack of funds, and the continued absence of necessary legislation. Meanwhile the Chairman of the Malaria Advisory Board emphasizes the wastage of man power financial loss, and misery caused to hundreds of thousands of people due to the disease (see this *Bulletin* 1937 Supp. p. 160\*).

At the Institute for Medical Research the Malaria Research Officer investigated and demonstrated the efficacy of atabrin as a prophylactic and examined the claims of malorein, a drug widely advertised in the near East. Experiments in improving the composition of anti-larval oils were continued.

No case of *cholera* has been reported since 1927 nor of *plague* since 1923. There were no cases of *smallpox* but routine vaccinations were continued, 81,629 vaccinations being performed during the year.

Eleven cases of *cerebrospinal meningitis* with nine deaths were recorded 8 cases with 6 deaths in Selangor and 3 fatal cases in Perak. Cases of *tropical typhus* admitted to hospitals numbered 211 and 19 deaths were recorded. At the Institute for Medical Research, after five years of investigation, the Pathologist has proved that the two diseases rural typhus and Japanese River Fever are identical, the discovery is of no little scientific interest and reduces the number of typhus-like fevers in Malaya from three to two. Nine cases of *acute poliomyelitis* with one death were reported from Selangor.

Cases of *diphtheria* dealt with in Government Hospitals numbered 140 with 42 deaths while total deaths due to this cause in the Federated Malay States numbered 48 with 161 notifications of cases of the disease (see this *Bulletin* 1937 Supp. p. 160\*). Of the total deaths recorded the State of Selangor again heads the list with 26. Hospital admissions of patients suffering from *influenza* numbered 5,729 and of these 18 died.

*Enteric fever* is said to occur mainly in the urban areas and so far as can be ascertained is directly connected with hawkers of food. Hospital cases dealt with numbered 328 and of these 309 were admitted during the year of the total cases 312 were *Bact. typhosus* and 16 *Bact. paratyphosus* infections. At the Institute for Medical Research work begun in 1932 on the enterica group was continued. results of the investigation are expected to be available during 1937.

Under the title of *dysentery* 1,347 cases were treated as in-patients at Government Hospitals and 203 died. there were also 2,150 cases

of diarrhoea and enteritis with 428 deaths. In the four Federated Malay States deaths due to dysentery and diarrhoea totalled 1 696 it is thought the incidence of the disease is related to recently arrived Indian immigrant labourers but a variety of factors are involved none being held solely responsible.

Both the incidence and mortality due to beriberi show increases over 1935 experience. Hospital admissions numbered 586 cases treated 661 and 66 of these patients died. In the Federated Malay States as a whole there were 339 beriberi deaths 124 of these occurring in the State of Selangor.

Of tuberculosis it is said that though total deaths due to this cause show a slight increase over the record for 1935 and that the great majority of cases reported are town dwellers no figures of any value are available relating to the incidence of the disease. Hospital cases of all forms of tuberculosis numbered 2 466 and 2 241 of these were admitted during the year. Of the total cases treated, with 902 deaths 2 212 were of the pulmonary form of the disease and in this group 821 deaths were recorded. Cases seeking admission to hospital are usually in an advanced stage of the disease this is particularly true of the Chinese among whom incidence is high (see this *Bulletin*, 1937 Supp p 161\*). The problem is being dealt with by improving housing general measures of sanitation and by education of the poorer classes. During the year 2,808 persons were admitted to hospitals suffering from pneumonia and broncho-pneumonia and 1 274 died while there were also 3 167 admissions for bronchitis with 81 deaths.

With regard to helminthic diseases all that is said is that they take a heavy toll in disability. Hospital returns show 1 026 in patient cases of ankylostomiasis and 1,362 of ascariasis. At the Hospital Laboratories there were examined 177 485 faecal specimens relating to 104,859 patients positive findings included 10 697 containing ova of ankylostome and 27,263 of ascaris.

Leprosy a disease now very much a concern to Government again shows an increase for the population of 1,830 patients in the Sungai Buloh Settlement at the end of the year is an increase of 237 over the corresponding figures at the end of 1935. Admissions during the year numbered 441 and re-admissions of discharged patients 108 70 patients died and only 50 were discharged the small number of the latter being partly ascribed to the fact that the standard of fitness for discharge has been raised considerably (see this *Bulletin* 1937 Supp pp 161\*-162\*). Of the total of 1,830 patients 1,380 were Chinese and 302 were Indians. Methods of treatment follow along the general lines described in these pages a year ago the percentages of improvement recorded in various types of leprosy being as follows —

	C1 Mild cutaneous	C2 Medium severity	C3 Advanced cutaneous	Neuro Macular	Nerve
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Malays	90	22	2	38	21
Indians	68	8	2	47	21
Chinese	78	28	10	33	17

In the course of routine treatment of 230 *tuberculous* cases by esters it was noted that nearly 75 per cent. showed no appreciable improvement 20 per cent were better and 5 per cent. were worse. It is said results suggest that esters treatment of this type of leprosy may be supplemented with benefit by one of the phthalic acid group Hydnocarpus derivatives incorporated into an ointment or lotion are described as of especial value in the treatment of spreading leprotic sores the effects being said to be little short of dramatic.

The Laper Asylum at Kuala Lumpur continues to house chronic incurable lepers who are opium smokers no additions to the numbers of inmates were made during the year at the end of which there were 200 patients accommodated

*Internal diseases*—The number of cases treated at hospitals and clinics continued to decline during 1936 and 17 741 cases were dealt with as compared with 18 422 in the preceding year. The following Table shows the distribution of type of disease in conjunction with racial origin or nationality.

Race etc	Syphilis	Gonorrhoea	Soft Chancres	Total
Chinese	4 481	2 583	568	7,592
Tamils	3 009	2,612	821	6,442
Malays	1 444	916	87	2,447
Sikhs	329	317	90	736
Europeans	59	59	12	130
Europeans	—	32	8	63
Others	178	144	9	331
Totals	9,502	6,643	1,594	17 741

To the *Central Mental Hospital* 1,087 patients were admitted, 963 were discharged and 203 died, leaving 2,826 under treatment at the end of 1936. Accurate histories being difficult to come by the causative factors in the majority of cases are not very reliable syphilis appears from available records to predominate as a cause of mental disease.

*Other diseases* referred to in the Report include the following Hospital admissions for cancer numbered 510 and there were 175 hospital deaths due to this cause. Eleven cases of *leptospirosis* with five deaths were recorded. Negri Sembilan remained free from the disease cases occurring in the other three of the Federated States. Cases of *anaemia* numbered 1,821 a considerable number of these were probably secondary to and final stages of, diseases such as malaria and ankylomiasis.

*Scientific*—The results of routine examinations at Hospital Laboratories and of some of the research work carried out at the Institute for Medical Research have already been referred to in the preceding notes. It remains to say that at the Institute for Medical Research other activities included the study of cases of *agranulocytosis* and *glandular fever* diseases rare in Malaya, while the Entomologist commenced an investigation into the problem of *filariasis* in collaboration with Dr J J C. BUCKLEY of the London School of Hygiene and Tropical Medicine.

169\* FEDERATED MALAY STATES—  
STRAITS SETTLEMENTS (1936)

*Financial*—Total expenditure on Medical Department services amounted to \$4 127,957 (£481 595) a sum which represents 6·1 per cent. of the total revenue or 7·8 per cent. of the total expenditure of the Federated Malay States during 1936. In addition the Public Works Department expended \$163 243 on new hospital and institutional buildings and \$112,287 on maintenance and repair services etc. while from Sanitary Board and other Government funds a sum of \$458 626 was spent on antimalarial works of various kinds.

STRAITS SETTLEMENTS (1936)

The Colony of the Straits Settlements the collective name given to the Crown Colonies formed by the British possessions on or adjacent to the mainland of the Malay Peninsula, as opposed to the Federated and Unfederated Malay States consist of the island of Singapore with about a score of small islets lying in its immediate vicinity the town and territory of Malacca, the island of Penang and Province Wellesley and the island of Labuan. The total area is about 1,357 sq. miles (Singapore 220 sq. miles Penang and Province Wellesley 400 sq. miles Malacca 640 sq. miles) and Labuan 35 sq. miles.

*Introductory*—The reader is referred to p. 162\* *supra* where mention has been made that in 1936 the Annual Reports of the Federated Malay States and Straits Settlements appeared for the first time under one cover.

*Vital Statistics*—The mid year population was estimated to be 1 168 197 the local and racial distributions being as follows —

Item	Singapore	Penang	Province Wellesley	Malacca	Labuan	Total
Europeans	10 452	1 747	284	422	29	12,834
Eurasians	7 437	2 177	288	2,203	43	12 150
Malayans	69,872	40 781	73 902	104,261	5 130	294 046
Chinese	455 191	131 183	48,394	71,239	2,997	708,404
Indians	51 740	28,347	24,996	24 085	147	129,315
Others ..	8,371	1 759	541	616	61	11,348
Totals	603 163	205 694	148 405	202,828	7,807	1 168 197

*Registered live births* numbered 51 788 giving a crude birth rate of 44·3 per 1 000 the highest rate so far recorded in the Colony. The highest birth rate recorded was that for Chinese in Singapore. It is pointed out that among the Chinese population the proportion of women of child-bearing age has increased steadily since 1931. *Registered deaths* totalled 29 094 and the crude annual death rate 24·9 per 1 000 a slight improvement over the 1935 rate. *The Infant*



*Mortality Rate* notwithstanding the increased attention devoted to infant welfare activities rose to 170.9 per 1 000 live births, the rate recorded after correction for children born elsewhere. In an attempt to account for the increased rate it is pointed out that during 1936 women were employed in industry to a greater extent than usual. Infant mortality continues to be highest among Malays in Singapore and Malacca.

*Maternity and Child Welfare Work.*—During recent years Government has devoted special attention to the provision of maternity and infant welfare services. Maternity wards or beds are available at most of the hospitals (see this *Bulletin* 1937 Supp. p. 165) and during the year under review the details of work shown in Table on following page were recorded.

Regular courses of training continue to be provided (see this *Bulletin* 1937 Supp. p. 165). Registered midwives in the Colony numbered, Class A 326, Class B 851 and Class C 341.

Centre	Admissions	Deliveries	Maternal Deaths
<b>Singapore</b>			
General Hospital	1 176	1,014	10
Maternity Hospital, Raudang Kerbau	8 142	4,717	62
St. Andrew's Mission Hospital	?	431	?
Kwong Wai Shun Hospital	?	349	?
<b>Penang</b>			
King Edward VII. Maternity Hospital	2,187	1,996	28
Butterworth Hospital	70	61	?
Bukit Mertajam Hospital	63	63	2
Sungei Bahay Hospital	76	69	4
<b>Malacca</b>			
General Hospital	713	606	18
Alor Gajah Hospital	66	47	3
Jasin Hospital	42	40	0

*Infant Welfare Centres* supervised by Health Officers are placed in charge of Health Sisters to whom are attached Health Nurses, Health Visitors and trained Midwives (see this *Bulletin* 1937 Supp. pp. 165\*–166\*). There are now 23 Government Infant Welfare Centres and 9 Sub-Centres. attendances at clinics totalled 189 743 and visits to houses 213,152. At the three Singapore Municipal Clinics 17 418 new infants were placed on the registers, attendances numbered 46 888 and 26,062 visits were paid to the homes of 18,304 mothers.

*The Women's and Children's Dispensaries* conducted by Government in the large towns continued to function with success. During the year 49 069 new patients were dealt with and among them 24 756 children.

*School Hygiene.*—The arrangements providing for the inspection of schools and schoolchildren in Singapore, Penang, Province Wellesley and Malacca remain as previously described (see this *Bulletin* 1937 Supp. p. 166\*). Below are given the principal facts recorded during the medical inspection of children, but it is necessary to mention that in addition to these details, routine inspections of schools and school premises were made on numerous occasions in all areas for purposes of general school hygiene by Medical Officers and Sanitary

Inspectors in this connexion it may be noted that a number of private or aided Chinese and Tamil schools are at present subject to sanitary supervision health conditions in such schools are gradually being brought into accordance with the requirements of the *Regulation of Schools Ordinance*. The following is a summary statement of the principal findings recorded during the course of medical examinations in various schools —

*Singapore*—Girls Schools visited 31 pupils examined 8,384 pupils referred for treatment 6192, principal defects noted—defective vision etc. 66.3 per cent dental caries 59.9 per cent enlarged tonsils 11.3 per cent Hookworm and round worm common in teachers and pupils of Malay Girls Schools Boys Schools visited 46 pupils examined 10,928 principal defects noted—dental caries 30.8 per cent defective vision etc. 5.0 per cent skin diseases 6.1 per cent

*Penang*—Pupils examined in *English Girls Schools* 1481 of these 46.9 per cent. with gross dental defects 10 per cent. with defects of throat nose and ear *English Boys Schools* pupils examined 4786 with gross dental defects 55 per cent nose throat and ear defects 7 per cent. *Malay Vernacular Schools* girls examined 1677 with dental defects 65.9 per cent. nose throat and ear defects 10 per cent Boys examined 3,233 and of these 67.4 per cent. with dental defects 9.8 per cent. nose throat and ear defects 7 per cent. with skin affections

*Province Wellesley*—*English and Vernacular Schools* pupils examined 4,235 of these 35.8 per cent showed dental defects 11.7 per cent. skin affections 7 per cent. nose throat and ear defects. Hookworm and round worm infestations common in Malay schools in Penang and Province Wellesley

*Malacca*—*English Girls Schools* pupils examined 896 with carious teeth 51 per cent. with enlarged tonsils 21 per cent *English Boys Schools* pupils examined 1693 with carious teeth 57.3 per cent. with enlarged tonsils 6.6 per cent. *Malay Vernacular Schools* Boys examined 8147 with carious teeth 11.5 per cent enlarged tonsils 6.8 per cent. enlarged spleens 3.4 per cent. *Malay Vernacular Schools* Girls examined 325 with carious teeth 18.5 per cent. with enlarged tonsils 9.5 per cent enlarged spleens 0.6 per cent

*Public Health Sanitation etc*—The general health of the people of the Colony is reported to have shown a definite improvement during the year under review no case of dangerous infectious disease was reported nor were there outbreaks of any infectious disease

No important new developments nor major building schemes were undertaken owing to the necessity for economy but plans and schemes were prepared for expansions along approved lines as soon as the financial position permits The large increase in the garrison at Singapore is a matter of importance from the public health point of view With one exception barracks are in the rural area and extensive anti-malaria measures have been undertaken in the interests of the health of the troops. Anti malaria work is described in great detail in the Report under review and this section also contains a series of excellent photographic illustrations of special features of the work and methods adopted for dealing with the malaria problem.

Methods of sewage disposal and refuse disposal remain for all practical purposes as previously described (see this Bulletin 1937 Supp p 167\*)

Though in the Singapore area 365 bore-hole latrines were constructed during 1936 it is said that a large part of the population still incline to follow easy and primitive means of disposal of excreta with consequent risk of water pollution dangers from hookworm infection etc. In Penang 800 latrines were constructed or reconditioned, and 363 pit latrines and 368 deep bore-hole latrines provided. With regard to water supplies (see also this *Bulletin* 1937 Supp. p. 167\*) it is stated that in the Singapore area shallow earth-wells—liable at all times to pollution and sources of mosquito breeding—still serve a large majority of the population. Considerable progress was made in extending the supply of Municipal water to the Rural Area where there were 58 standpipes and 127 hydrants in use at the end of the year. Further provision in this direction is to be made.

Arrangements made for the control of *foods and drinks* manufactured or exposed for sale were described in these pages a year ago. It is stated that though there were 32 dairies in the Singapore area, only two under European management were satisfactory. *Housing and Town Planning* matters continue to receive the attention of the responsible authorities. Sanitary Inspectors make house-to-house inspections, and it is stated considerable improvement has been effected in recent years as a result of this practice. *Estates* are regularly visited by Officers of the Health Branch and recommendations for sanitary improvements submitted to owners and managers where necessary.

*The Training of Sanitary Personnel* was continued. Nine private and eight Government students attended the course at Singapore. 29 candidates sat for the examination of the Royal Sanitary Institute and 21 were successful. Weekly and monthly meetings are also held at area centres where problems are discussed with Health Officers and Sanitary Inspectors.

*Measures taken to Spread Knowledge of Hygiene and Sanitation* continued along the lines previously described (see this *Bulletin* 1937 Supp. p. 167\*).

*Port Health Work*—Quarantine measures were declared against ships arriving from certain ports in Siam, India, and China. Among other details of work during the year the following facts are recorded:—

	Singapore	Penang
Ships examined	555	536
Infected ships	0	3
Crew examined	75,858	45,825
Passengers examined (includes Pilgrims and Chinese immigrants)	206,317	99,194
Rats trapped and bacteriologically examined	683	?
Rats plague-infected	0	?
To the Singapore Quarantine Station 4,657 passengers admitted		3 deaths
„ Penang	23,281	5 „

At the Airports of Singapore and Penang, which have been designated *Sanitary Aerodromes* as defined in the Sanitary Convention (Air Navigation) facilities for quarantine are being provided.

*Hospitals Dispensaries etc.*—At Government Hospitals in the Straits Settlements (see this *Bulletin* 1937 Supp. p. 168\*) the record of work concerned with in-patient cases (exclusive of cases in Lepar Settlements) reads as follows:—

## 173\* STRAITS SETTLEMENTS (1936)

Hospitals in	Total Treated	Hospital Deaths	Out patients
Singapore	39,242	3,993	37,427
Penang	21,310	1,574	39,425
Malacca	9,250	693	13,282
Labuan	200	7	1,249
Totals	70,002	6,262	91,383

[In another place it is stated 67,429 patients were admitted to Hospitals 72,135 were treated and that 6,425 died.]

The prevailing diseases among in patients were *malaria* *respiratory* *affections* *intestinal ailments* *helminthic* and *venereal diseases*

In addition to Out-patients treated at Hospitals (see above) 91,632 out patients were treated at *Dispensaries* and 82,659 at *Travelling Dispensaries* during the year under review. Out patient figures do not include those relating to patients treated at Infant Welfare Centres School Inspections Special Clinics etc

The notes which follow briefly summarize the reported descriptions of the principal diseases treated at various centres during 1936

The incidence of *malaria* as judged by recorded figures declined considerably 9,502 cases being admitted to Government Hospitals and 9,749 cases were treated as compared with 13,432 admissions in the preceding year and there were 283 deaths due to this cause. Deaths due to *malaria* in the Straits Settlements as a whole numbered 1,315 but there were also 3,562 deaths ascribed to *unspecified fevers*. Types of infection among the 9,749 in patient cases dealt with included 4,410 *subtertian* 2,702 *benign tertian* and 188 *quartan* while 210 were mixed infections and 1,770 were unclassified. Attention has been made in the section *Public Health* above of antimalaria work undertaken in the Colony. There was one non fatal case of *blackwater fever*

The *Third International Course in Malarialogy* in the Far East organized by the League of Nations was held at the King Edward VII College of Medicine Singapore in April, May and June practical field studies being arranged for in Indo-China Java and Malaya. The course was attended by 18 graduates from nine countries.

*Plague* has not occurred in Malaya for many years. *Cholera* is now rare owing to the provision of good water supplies and the special measures taken at ports and frontiers to exclude the disease. There is little *smallpox* in Malaya small outbreaks occur from time to time but they are easily controlled (see this *Bulletin* 1937 Supp p 168\*) 11 children born and all immigrants are vaccinated during 1936. Government Health Department Officers performed 21,254 primary and 143,625 re vaccinations. Of *tropical typhus* 33 cases and two of these were reported and 5 cases of *Japanese River Fever* [With

ard to the latter the reader is referred to the researches of the bacteriologist at the Institute for Medical Research Kuala Lumpur p 166 *supra*] There were 21 cases of *cerebrospinal meningitis* of which 19 proved fatal. In the Hospital Returns it is seen that 58 patients were admitted suffering from *diphtheria* and 20 died while 84 deaths were ascribed to this cause in the Colony as a whole. On the other hand cases notified in the City of Singapore alone numbered 176

As regards *enteric fever* it is again pointed out that itinerant hawkers of foodstuffs are mainly responsible for the presence and spread of the disease. During the year 565 cases of *typhoid* and 14 of *paratyphoid fever* were dealt with as in-patients at Government Hospitals and 146 of these died. In the Colony as a whole 187 deaths were recorded and in Singapore alone 453 cases of the disease were notified. In patients treated for *dysentery* at Government Hospitals totalled 865 and 197 deaths were recorded. The classification of cases reads 277 amoebic, 507 bacillary 9 were mixed infections and 72 were undefined. In the Colony as a whole 314 deaths were ascribed to dysentery and there were in addition 1417 deaths assigned to the title *diarrhoea and enteritis*.

*Tuberculosis* is said to be increasing slightly and that the great majority of the cases dealt with are of the *pulmonary* form of the disease. Deaths due to all forms of tuberculosis in the Colony numbered 2,362 of which 1406 occurred in Singapore. Returns relating to Government Hospitals contain the following facts —

Cases of tuberculosis (all forms) dealt with	3,252, deaths 1108
Admissions during the year	2,876
Cases of pulmonary tuberculosis alone	2,832, deaths 984
Cases of pulmonary tuberculosis admitted	2,602

The measures taken to combat the disease were detailed in these pages a year ago. Facilities for medical and surgical treatment are provided at the General Hospitals where special tuberculosis wards are available. The difficulty of persuading the poorer class of patient to seek treatment in early stages of the disease is again emphasized (see this *Bulletin* 1937 Supp. p. 169\*). In patients at Government Hospitals treated for *lobar pneumonia* and *broncho-pneumonia* numbered 1724 (1611 admissions) and 974 died. The death-rate from pneumonia amongst Asiatics who are vulnerable to the disease is characterized as "alarming." There were 1409 in-patients treated for *bronchitis* with 22 deaths.

*Leprosy* — The increase in the number of cases seeking admission to leper settlements is a matter of grave concern to the Government and steps are being taken to deal with the problem. At present compulsory segregation of lepers is imposed by law but as it is generally believed that drastic legislation has the effect of driving lepers into hiding it is proposed to amend existing laws. Examination of immigrants at ports of entry makes it clear that the majority of the cases of the disease are introduced from outside Malaya. The Chinese immigrants are mainly responsible for owing to the long incubation period infected persons may show no signs of the disease on arrival. Efforts are now being made to detect early signs of leprosy in Chinese and other immigrants (see also this *Bulletin* 1937 Supp. p. 169\*). Intensive treatment on modern lines was continued throughout the year at the Leper Settlements. The Reports of these Institutions describe the year's work in great detail, and from them the facts tabulated on p. 175 have been extracted.

Of the 1,217 patients at Pulau Jerejak, 690 were Chinese 187 Indians and only 37 were Malays. At this Settlement during the year Camp E, providing 37 double huts with all necessary additions as regards sanitary conveniences, water supplies etc. was practically completed, while Camp F was occupied in October and 174 cases transferred there.

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Item	Leper Settlements	
	Pulau Jerejak, Penang	Leper Settlement Singapore
Admitted during 1936	421	237
Total treated	1 447	508
Discharged	22	10
Abandoned	190	27
Died		13
Remaining at the end of 1936	1,217	224

*Enterical Diseases*—There are V D Clinics for males in Singapore Penang and Malacca special sessions are held for women at the Women's and Children's Dispensaries in Singapore and Penang and in addition facilities for treatment are provided at all hospitals and outdoor dispensaries. New cases presenting themselves for treatment at Government Clinics totalled 22,680 and of these 11 652 were Chinese 6 794 Indians 2,873 Malays 576 Europeans and 785 were grouped under the title of Others. At Government Hospitals the following in patient cases were dealt with—

	Syphilis	Gonorrhoea	Soft Chancre	Tropical Bubo	Other V.D.
Admitted	1,297	665	276	128	221
Total treated	1,391	702	298	135	237

Only 19 in-patient cases of yaws are mentioned but out patients treated for this disease numbered 5 711. The incidence of beriberi during the year 1 064 cases were dealt with of which 552 were Chinese and 399 European seamen.

Among other diseases discussed in the Report under review the following have been selected for mention. During the past few years has been closely related to the level of general prosperity—during times of economic stress the enforced consumption of home-grown rice displaces the highly polished rice with resulting benefit to health. During the year 1 625 in-patients were treated (1,513 admissions) at Government Hospitals with 377 deaths of chronic ulcers and 345 admissions recorded as due to anæmia. Motor vehicles were responsible for 712 cases (with 47 deaths) out of 3 758.

*King Edward VII College of Medicine Singapore*—At the commencement of the academic year in June 1936 with an entry of 20 medical and 18 dental students there were 211 students on the roll of which 117 were medical, 62 dental and 8 pharmacy students. During the year 161 candidates sat for various professional examinations 81 passed 14 obtained exemption and 66 failed among the successful candidates 7 medical, 3 dental and 9 pharmacy students completed.

their course and qualified. (The first qualifying examination for the Diploma in Pharmacy was held in August 1936 see this *Bulletin* 1937 Supp., p 170.)

Valuable research work was continued in various Departments of the College. On the recommendation of the Council of the College Government agreed that the nutritional researches undertaken by Professor J. L. ROSEDALE and his staff should be continued (see this *Bulletin* 1937 Supp. p 170\*) with financial assistance granted by the Colonial Development Fund. An investigation undertaken to test the value of the histidine treatment of gastric ulcers controlled by Professor R. B. HAWK of the Department of Medicine found that the drug had no curative effects on such ulcers. Professor B. A. R. GATER of the Department of Biology continued his studies of Malayan anophelines. Other work included investigations on Malayan parasitic worms and species of flies frequenting faecal matter. Professor E. H. TRATMAN carried out a number of investigations concerned with dental conditions. Scientific publications by members of the Staff included —

GATER (B. A. R.) Revised edition of *Notes on Microscopy and Entomology* (Published for the convenience of graduates attending the International Course in Malariology.)

TRATMAN (E. H.) *Notes on some Human Teeth from a Neolithic Cave in Malta—Proceedings University of Bristol Speleological Society* 1935 Vol 4 No 3 pp 233-249

— Note on the dental conditions of entrants to King Edward VII College of Medicine Singapore—*Malayan Medical Journal* 1935 Vol 10 No 1 p 16

— A case of dental caries in an unerupted lower third molar—*British Dental Journal* 1936 Vol 61 p 166

— Adamantinomas or multilocular cysts of the jaws—*Ibid* 1935, Vol 60 pp. 417-438

SCHARFF (J. W.) Anti-malarial drainage from the point of view of the Health Officer—*Malayan Medical Journal* 1935, Vol 11 No 1 p 40

— Filling tree holes an anti-mosquito measure—*Ibid* p. 58

— Anti-malarial drainage from the point of view of the Health Officer—*Ibid* No 2 p 67

Scientific—The summary of work carried out at laboratories in Singapore Penang and Malacca includes the following items —

	Singapore	Penang	Malacca	Total
Serological tests for typhus	10,340	8,361	4,434	23,135
Microscopic examination of bloods, pus, etc.	66	2,837	15,147	17,752
Cultural examination of bloods, etc.	4,661	1,464	464	5,589
Blood agglutination tests	731	215	403	3,349

Among 1,364 samples of blood serum examined for the presence of the specific agglutinins of the enteric bacilli 212 were positive to *Bact. typhosum*. An investigation into the "H" and "O" agglutination, and "clot culture" in enteric infections was carried out but owing to pressure of routine work analysis and publication of findings

were not possible. The serum of a European patient agglutinated positively with *Br melitensis* and *Br abortus* cases of this infection are rarely met with in Malaya. A marked increase in the numbers of faecal specimens received is mentioned almost similar findings as in previous years were recorded with 283 Flexner strains 26 of the non-mannite Flexner group 39 Shiga and 24 Sonne bacillus. Scientific publications included —

- SURRAHMANYAM (C) Tropical Typhus in Singapore — *Transactions Royal Society of Tropical Medicine and Hygiene* 1938 July Vol. 30 No. 2, pp 263-268  
 — Influenza meningitis in Infants — *Malayan Medical Journal* 1938 Sept. Vol. 11 No. 3  
 — *Financial* — Total expenditure on Medical and Health Services during 1937 amounted to £3 479,345 distributed as to Singapore \$2 119,217 Penang \$958,989 Malacca £376 038 and Labuan \$27 103

Sums expended by the Public Works Department on the upkeep of buildings etc are not included in these figures

### Penang Straits Settlements.

#### MUNICIPAL HEALTH OFFICER'S REPORT ON THE HEALTH OF THE MUNICIPALITY OF GEORGETOWN PENANG 1936

*General* — In the main the Report follows traditional lines the textual comments except in special cases to be referred to hereafter remain for all practical purposes unchanged and as described in previous issues of this Supplement

*Vital Statistics* — The estimated mid year population was 165 411 distributed as to Europeans 1 299 Eurasians 2 187 Chinese 112 086 Malays 21 185 Indians 28 704 and Others 1 950 *Registered births* numbered 5 975 giving a crude birth rate of 36.1 per mille for the population as a whole. The racial distribution of birth rates reads Europeans 41.6 Eurasians 20.6 Chinese 40.6 Malays 24.4 Indians 28.9 and Others 21.0

*Registered deaths* numbered 3 659 and the crude death rate 22.1 per mille or corrected for non residents 19.4 per mille. The racial distribution of mortality rates was as follows: European 4.6 Eurasian 11.4 Chinese 19.8 Malay 22.3 Indian 17.3 and Others 13.3 per mille respectively

There were 755 *infant deaths* giving an infant mortality rate of 128 per 1 000 live births. Of the total deaths in this group 283 or 37.5 per cent. occurred within one month after birth 519 or 68.7 per cent. within three months of birth while 78 per cent. of all infant deaths were due to intestinal and respiratory diseases prematurity debility and convulsions

*Maternity and Child Welfare Work* — A considerable amount of new information is supplied under this heading for 1936 saw the appointment of a Lady Assistant Medical Officer and the opening of another Maternity and Child Welfare Centre so that a real beginning of another important branch of work can be recorded. At the new Welfare Centre sessions were held on four days each week and at the Coole Lines Clinic on three days in each week.



Although these Centres were functioning only from August to the end of the year 921 first attendances and 1 683 re-attendances were recorded at the Kimberley Street Centre and 161 first and 645 re-attendances at the Coolie Lines Clinic. About 50 per cent. of all first attendances were made by mothers with babies under 12 months old. As regards first attendances at Kimberley Street 88.6 per cent. were Chinese, 8.7 per cent. Tamils and only 1.0 per cent. Malays but at the Coolie Lines Clinic, the percentages read, Chinese 28.6 Tamils 53.4 and Malays 16.1 respectively. A considerable difference is noted between disease distribution among patients at the two Centres the principal findings may be set out as follows —

	Kimberley Street	Coolie Lines
	Per cent	Per cent.
Acute cases	5.9	22.7
Bronchitis	17.2	5.6
Eczema	4.3	Nd
Furunculosis	8.0	3.1
Malnutrition	7.5	4.4
Rickets	1.0	Nd
Scabies	Nd	1.9

It was noted that practically all children under one year in the Coolie Lines are breast fed, whereas only about 50 per cent. of those attending Kimberley Street enjoy this benefit. Special attention is being given at the Centres to the importance of breast feeding and the education of expectant mothers.

The very important home-visiting side of the work was continued under the supervision of the two whole-time Health Sisters (see this *Bulletin* 1937 Supp. p. 172\*) the number of visits paid by the Staff employed for this work numbering 63 174 a considerable increase over the 1935 records. At the end of the year midwives registered under the Midwives Ordinance were Class A 77 Class B 271 and Class C 10.

*General Hygiene Sanitation etc.*—One or two important administrative changes characterized the year under review. From January 1936 the whole of the *Censuancy* work of the Municipality with the exception of the disposal of refuse was transferred to the control of the Health Department which also assumed control of all markets and street stalls. The various services concerned functioned satisfactorily. Necessary steps were taken to ensure that licensed stallholders kept within the limits of their sites, while the nuisance of unlicensed street stalls was adequately dealt with.

The anti-mosquito gangs continued to be employed in cutting down vegetation, digging leveling and clearing ditches. The freedom from mosquitoes is commented upon and is attributed to the energetic application of anti-mosquito measures and the vigilant supervision of culing gangs and other workers.

*Water Supplies* were both adequate as to quantity and satisfactory as to quality throughout the year. Special attention was devoted to the supervision of milk supplies (see this *Bulletin* 1937 Supp. p. 173\*).

The Chief Sanitary Inspector contributes the usual detailed report

of the work of this Department. A feature of the Report under review is the large amount of detailed information relating to various branches of Public Health work and set out in a series of carefully arranged tables.

Information relating to *morbidity experience* during the year appears to be limited to the records of reported cases of notifiable infectious diseases. For the eleven diseases scheduled a total of 673 notifications was received, tuberculosis being responsible for 336 chickenpox 178 enteric fever 60 diphtheria 35 puerperal fever 23. On turning to the *mortality returns* the following causes call for mention —

Malaria caused the deaths of 32 people. All malaria deaths are carefully investigated with a view to the discovery of the probable origin of infection and following such enquiries it is stated that in the case of one death recorded as due to infection within Municipal limits, the diagnosis was regarded as doubtful in six the origin of infection could not be determined. For the remaining 25 infection occurred outside the Municipal boundaries. It should be noted also that in addition 406 deaths were ascribed to *unspecified fever*.

It has been observed that 60 cases of *enteric fever* were notified during the year deaths due to this cause numbered 23. *Dysentery* does not appear to be a notifiable disease—23 deaths were registered and also 110 deaths were recorded as due to *diarrhoea* and 123 to *enteritis*.

Deaths due to *tuberculosis* (all forms) totalled 336 a figure equalling the number of tuberculosis notifications (see above) and of the total 304 deaths were ascribed to the *pulmonary* form of the disease. Tuberculosis is still, apart from deaths due to *unspecified fevers* the highest cause of mortality in Penang. *Bronchitis* was responsible for 178 deaths, *pneumonia* for 147 and *other respiratory diseases* for 253.

*Beriberi* caused the deaths of 63 persons during 1936 as compared with 57 in the preceding year. 55 of the deaths occurred among Chinese persons and 8 among Malays (see this *Bulletin* 1937 Supp p 173\*).

Brief reference has already been made to the numbers of cases of *notifiable diseases* recorded during the year. It remains to say that Indians continue to show a distinct susceptibility to chickenpox 142 members of this race contracting the disease. Of the 35 cases of *diphtheria* 29 occurred among the Chinese of 14 fatal cases one was notified three days before death, three one day before death and the remaining ten notifications were received almost at the same time as the death certificate suggesting that medical attention was sought too late. One fatal case of *cerebrospinal meningitis* and one fatal case of *whooping cough* both in Chinese children aged 6 months were recorded. The 23 cases of *puerperal fever* (see above) were distributed as to 9 Chinese 8 Malays, and 6 Indians. 17 deaths were ascribed to this cause.

*Venereal Diseases* received no mention in the text of the Report under review but the mortality returns contain the record of 22 deaths due to *syphilis*. No case of *plague* or of *smallpox* was notified. The special rat-catching gang continued their activities and by direct slaughter accounted for 7,500 rats during the year. The anti-smallpox vaccination campaign continues to be energetically pursued, practically all vaccinations being carried out by house-to-house visits. During the year Health Department Staff performed 3,523 vaccinations, of which

3,281 were primary and 242 secondary Government vaccinators performed 131 primary and 1,451 secondary vaccinations mostly among school-children while 1,034 primary vaccinations were done by private practitioners. No serious results were reported.

*Financial*—Total expenditure on Health Department services amounted to \$182,062 or deducting revenue, a net expenditure of \$146,487. This works out at about 93 cents (or 2/1½ sterling) per head of the total population.

### Municipality of Singapore (1938)

*Vital Statistics*—A census of the Municipal area was carried out on the night of the 30th June 1938 the recorded population during that operation totalling 490,155 persons. These data are presented with distinction as to sex and race. Dr P. S. HUNTER, Municipal Health Officer, contributes an interesting discussion of the difficulties attending efforts to estimate the intercensal population of Singapore, where the absolute numbers and sex ratios of Chinese and Indians are subject to wide variations over quite short periods of time. Mr VIELAND, the Officer who conducted the 1931 Malayan census recommended new methods for the better estimation of the intercensal population, but these methods then appeared to Dr Hunter to be "too speculative and somewhat revolutionary" and the usual methods of estimation continued to be employed. However, Dr Hunter now generously recognizes the value of Mr VIELAND's recommendations and observes,

"I am now quite convinced that had I employed Mr Vieland's method I should have given estimates that must have been approximately very close to the truth." The methods employed are described and the figures resulting from the Vieland and Official methods presented for purposes of comparison. Mr Vieland's method gives a population estimate within one per cent. of the actual recorded Census figure for 1938.

The vital statistical data for the Municipality may be set out as follows—

Race	Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Europeans	8,338	187	22.3	47	5.6	5	28.7
Europeans	131	18	25.4	87	12.2	3	137.4
Chinese	374,117	17,093	45.9	9,737	26.0	3,382	197.8
Malays	45,077	1,842	40.8	1,131	25.1	405	19.9
Indians	47,402	1,314	27.7	764	16.1	159	120.0
Others	8,070	260	3.2	116	14.4	23	96.1
Totals	490,155	20,678	42.6	11,877	24	4,001	191.6

*Maternity and Child Welfare Work*—Dr Muriel CLARK, Lady Medical Officer, again contributes a comprehensive account of the work concerned with the supervision of Midwives, Infant Welfare, etc. New babies entered on the Clinic Registers numbered 17,418 or 83.4 per cent. of the total births registered in the Municipality during the year under review. Clinic consultations totalled 46,883, and the Clinic Staff

of Health Visitors made 117 064 visits to the homes of mothers and children. In addition District Sisters and Staff Nurses paid 26 062 visits to 18 304 newly confined mothers in their homes and reported that 14 614 or 79 per cent. were living in cubicles or single rooms. A considerable increase in the number of Malay mothers and babies attending the Clinics is recorded and it may be noted that the Malay infant mortality rate has declined to a figure which constitutes a new low record on the other hand the Chinese rate shows an increase of over 14 per cent.

Dr Muriel Clark's observations concerning congenital syphilis and the prevalence of ante-natal and post natal beriberi are worthy of special consideration. No decrease in the numbers of cases of syphilis in mothers and babies attending the Clinics during 1936 could be reported gonorrhoeal conjunctivitis was as prevalent as ever it continued to be just as difficult to persuade these mothers to attend for treatment and only one per cent. or less of those attending continued the full course of treatment provided. A considerable increase in the number of cases of maternal and infantile beriberi was recorded some of the cases severe and demanding urgent hospital treatment. It is significant to note that *all the infant beriberi deaths in 1936 occurred among the Chinese*—there were 149 such deaths as compared with 57 in the preceding year (see this Bulletin 1937 Supp p 175\*)

Class B Registered Midwives attended 9,259 confinements Class C 995 and the three Municipal Midwives 1,364. In view of the increase in the work a fourth Municipal Clinic Midwife has been appointed.

*Public Health Sanitation etc.*—With regard to anti-malarial works it may be remembered that following upon the sharp outbreak of malaria during 1935 Dr Hunter called attention to the necessity of dealing with certain areas of swampy ground constituting specially dangerous breeding places (see this Bulletin 1937 Supp p 177\*) During the year under review energetic efforts were directed to the reclamation of the areas. Systematic mosquito surveys continued to be regularly carried out and collections of larvae and adult mosquitoes were examined and identified in the Laboratory. Extensions and repairs to existing anti-malarial works included the laying of over 3 000 yards of concrete channels 4,000 yards of concrete slab revetments and upwards of 4 000 yards of subsoil pipes. In a separate report Dr W DAWSON Deputy Health Officer describes at length the anti mosquito measures carried out in the Municipal area during 1936.

All water borne sewage was again treated at the Purification Works at Alexandra Road and crude sewage dealt with as previously described in the pages of this Supplement. The results of the daily analyses of crude sewage and effluents carried out at the Chemical Laboratory are set out in a series of Tables. The sources of supply of raw water and methods of treatment of raw waters remain the same as previously described. Samples received daily for analysis at the Chemical Laboratory were drawn from every part of the purification system and results showed that a pure and safe water was supplied. The results of these analyses are presented in a series of Tables.

The Inspector of Foods and Markets appends a separate Report describing the Municipal Markets their upkeep and repair, the

inspection of foodstuffs offered for sale in markets, shops etc. All foodshops, places of public resort slaughterhouses etc., are regularly inspected by District Sanitary Inspectors. Various returns set out the work of these Officials in great detail. At the Chemical Laboratory 1,061 samples were examined in connexion with the Sale of Food and Drugs Ordinance and of the total 406 were samples of milk and milk products. It is stated the proportion of adulterated milk samples from itinerant vendors was much smaller but the average extent of adulteration remained much the same.

*Hospitals Clinical Returns etc.*—Dr C C B. GILMOUR Medical Superintendent of the Middleton Hospital contributes a detailed report of the work of the institution under his charge. During the year 1 670 patients were admitted—a further new record of admissions—1,572 were discharged and 78 died.

Exactly half of the patients admitted, 835 suffered from chickenpox and almost one-fifth, or 339 from measles of the latter 229 were Municipal employees and only 20 were school-children. Measles gave rise to 181 cases with 11 deaths.

No case of cholera or plague was reported. Rat-catching continued and 4 005 rats were dissected none being found plague infected. *R. decumanus* continues to be the most common rat met with in the Town outnumbering *R. rattus* by 13 1 while in the Port area it forms less than one-third of the catch *R. rattus* predominating.

Only one case of smallpox an adult Indian male was admitted and as soon as diagnosis was confirmed the patient was moved to St. John's Island Quarantine station together with 68 contacts. During the year 16,311 vaccinations were performed, and of the 13,744 done by Municipal Vaccinators, 12 467 were children under one year of age.

Diphtheria was once again the most serious disease dealt with during the year 176 cases were notified, 148 were admitted to hospital, and 42 died. There is still a regrettable tendency on the part of parents to regard the affection lightly and it may be noted that among hospital patients 21 died within 24 hours of admission. Half the cases and two-thirds of the deaths were children under 5 years of age. 27 of the fatal cases gave histories of being ill for more than 6 days. Dr Gilmour again refers to the question of immunizing young children whose parents desire it. At the Laboratory *C. diphtheriae* was isolated in 282 of the 1 735 throat swabs examined.

Notified cases of enteric fever numbered 455 and of paratyphoid 6 but since 157 deaths were ascribed to the disease it is thought many other unreported cases occurred. Incidence was rather higher in the first half of the year with cases scattered indiscriminately about the Municipality with at no time any suggestion of a localized outbreak which could be attributed to any single source. Among school-children 82 cases were recorded. In this connexion it is observed that despite the extension of powers for dealing summarily with the peripatetic food hawker (see this *Bulletin* 1937 Supp. p. 177\*) assembled facts strongly suggest that the hawking of ice cream and iced drinks may be responsible for many of the cases. Agglutination tests were applied to 988 samples of sera. 122 reacted positively with *Bact. typhosum* 4 with *Bact. paratyphosum A* and 25 with *Bact. paratyphosum B*.

The mortality returns record 241 deaths as due to *dysentery* distributed as to 78 amoebic 56 bacillary and 107 undefined total cases of the disease are not stated. At the Bacteriological Laboratory *E. histolytica* was found in 39 of the 1,338 faecal specimens examined and among 347 specimens cultured *Bact. dysenteriae* Flexner was isolated from 2, and Hiss and Russell's bacillus from one.

Fifteen cases of *typhus fever* were notified and one death was ascribed to this cause. Only 16 cases of *cerebrospinal fever* are mentioned but the mortality returns show 17 deaths as due to this cause.

*Tuberculosis* (all forms) caused the deaths of 1 406 persons 1 262 of these deaths being ascribed to the *pulmonary* form of the disease. There was again an increase in the numbers of cases notified (*pulmonary* only?) 1,246 as compared with 1 053 in the preceding year 1 007 of the notified cases related to the Chinese. *Bronchitis* and the *pneumonias* caused 1,990 deaths. These respiratory ailments may be regarded as measuring the evil effects of overcrowding. Despite the activity of the Improvement Trust during the past few years in their efforts to improve housing conditions it is stated that insanitary dwelling places are more numerous than ever owing to the fact that new housing has not kept pace with the enormous increase in family life in the last decade.

No comment upon *malaria* incidence is given, though it is noted that 525 deaths were ascribed to the disease. At the Laboratory *malaria* parasites were found in 1 768 of the 9 477 blood films examined, the distribution of types of infection being 627 *subtertian* 1 136 *benign tertian* one *quartan* and 4 mixed infections.

*Beriberi* has been the subject of brief mention under the heading of *Child Welfare* above but it may be added that 767 deaths are ascribed to *beriberi* in the general mortality returns 693 of these occurring among the Chinese. *Cancer* caused the deaths of 235 persons *nephritis* 508, and *venereal diseases* 204. At the Laboratory blood samples submitted to Wassermann and Kahn tests totalled 1,956 the Kahn reaction was applied to 1,814 of these with results that agreed with Wassermann in 93 per cent. of cases.

*Scientific*—The detailed Reports of the Chemical and Bacteriological Laboratories again appear as Appendices to the General Report under review. During 1936 a high standard of work was maintained in both Laboratories routine examinations were unusually heavy yet time was found for engaging in much useful research work. Under *Public Health malaria dysentery* and other sections in this summary reference has already been made to some of the results of routine examinations samples dealt with in the Chemical Laboratory totalling 14 102 and in the Bacteriological Laboratory 28 418 the latter a new record for the Laboratory. At the *Chemical Laboratory* special experiments concerned with new methods of purification of sewage were continued along lines previously described (see this *Bulletin* 1937 Supp. p. 175\*). At the *Bacteriological Laboratory* in addition to the specimens already commented upon 3 781 faecal specimens were dealt with when 548 were found to contain *ancylostoma ova* 480 *ascaris* 762 *trichuris* and 25 *oxyuris*. Samples of concentrated syrup and of Chinese Chili sauce were examined to determine whether they were contaminated with bacilli of the enteric group or were likely to aid the spread of enteric fever. The conclusion reached was that

*Bact. typhosum* will not multiply in the syrup and if it gains access is quickly killed off the sauces were found to be heavily contaminated with faecal organisms and not very inhibitory to the growth of *Bact. typhosum*.

*Financial*—No details are supplied.

## MALAY STATES NOT INCLUDED IN THE FEDERATION

### Johore (1936)

The State of Johore lies at the southern extremity of the Malay Peninsula to the north is Pahang, to the north-west Negri Sembilan and Malacca on the west the Straits of Malacca, on the south the Strait north of Singapore and on the east the China Sea. The area of the State is about 7,320 sq miles almost exactly that of Wales

*Introductory*—The contents of the Report under review are arranged along the lines described a year ago (see this *Bulletin* 1937 Supp. p. 179\*) The tabulation of the facts and figures is for all practical purposes as extensive as in former years (see this *Bulletin* 1937 Supp. p. 183\*)

*Vital Statistics*—The Vileland method of population referred to in these pages a year ago has been adopted. The relevant facts for the year under review may be set out as follows —

Race	Estimated Mean Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Malayans	286,100	12,504	43.7	6,444	22.5	2,934	234.6
Chinese	274,400	11,341	41.3	4,844	17.7	1,473	129.9
Indians	65,000	1,806	27.8	1,279	19.7	254	140.6
Europeans	850	7	8.2	5	5.9	0	—
Eurasians	340	3	8.8	0	8.8	0	—
Others	4,510	136	30.8	60	13.3	14	166.7
Totals	631,200	25,800	40.9	12,632	20.0	4,675	181.2

*European Officials resident* numbered 123 no invalidings or deaths were recorded. *Asiatic Officials resident* numbered 7,082 and of these 68 were invalided and 12 died.

*Estate Populations*—The population of labourers employed on the 663 registered estates during the year is given as 651,135 and of their dependants 168,733 making a total of 819,868, while the monthly average of labourers and dependants is returned as 68,322. Among these people 745 deaths were recorded.

*Maternity and Child Welfare Work*—Maternity cases admitted to and delivered in Government Hospitals numbered 2,743 there were 55 maternal deaths and 2,265 babies were born in hospitals. Hospital Medical Officers with the assistance of Government or private midwives also attended 169 confinements and made 63 ante-natal and 404 post-natal visits at the homes of patients and dealt with 370 ante-natal and 128 post-natal cases at their hospitals.

*The Women and Children's Clinics* (see this *Bulletin* 1937 Supp p 180\*) continued to function with success. At these centres 56,966 new cases were dealt with (12 199 of these being infants and children) and 120 137 visits were made to patients in their own homes 710 of these being maternity cases. The Lady Medical Officer assisted by a Malay Certified Midwife treats people unable to attend the clinics in their own homes. During the year 621 such visits were made by the Lady Medical Officer and 267 by the Midwife alone. Among 166 new cases treated 154 were Malays.

*Pupil midwives* in training numbered 23 four passed the required examination and were granted their certificates and 7 new midwives were also authorized to practise as certified midwives. There are now 131 certified midwives registered in the State.

A *School of Nursing* has been organized for the local training of nurses and successful students will be appointed to the Johore Medical Department Nursing Service. Meanwhile a school of nursing was maintained at the General Hospital Johore Bahru 17 pupils were in training 8 passed the prescribed tests and were promoted to probationer nurses.

*School Hygiene*—During the year 6 698 boys were medically examined in 6 English and 47 Malay Schools and in 8 Malay Girls Schools 601 pupils were examined the general standards of cleanliness and general health were satisfactory the principal defects noted among the pupils being as follows—

Among boys examined 11.5 per cent with dental caries 3.8 per cent. with enlarged tonsils 3.2 per cent enlarged spleens 0.5 per cent skin diseases.

Among 305 girls examined 48.5 per cent. with dental defects 14.4 per cent. enlarged tonsils 9.8 per cent. skin diseases.

In rural areas the Motor Travelling dispensaries dealt with the treatment of minor ailments among school-children.

In addition the Health Staff paid 65 visits to 45 private (Chinese and Tamil) schools and recommendations regarding the premises were submitted to the Registrar of Schools unless requirements are complied with recommendation for registration is withheld. *Government Dental Clinics* for school-children were established at four hospitals. In 14 Boys Schools 2,345 pupils were examined and 74.8 per cent required dental treatment while in 6 Girls Schools where 731 pupils were examined 79.2 per cent showed dental defects.

*Public Health Sanitation etc*—A new *State Medical Board* of the Medical Department was established during the year in its consultative capacity the Board will deal with problems of special difficulty and with cases where the weight of the Board's opinion might emphasize the importance of new projects submitted to Government. According to the Report under review there are nine Town Board Areas wherein reside about 12 per cent of the total population of the State. [In 1935 three Town Board Areas were mentioned and within their boundaries 20-25 per cent. of the population were said to reside (see this *Bulletin* 1937 Supp p 181\*)] *Anti-malaria* work is carried out by Health Officers and their Staffs under the authority of the Anti Malaria Board which possesses wide powers all permanent works are carried out at the instance of the Board by the Public Works Department. The Report under review gives a detailed account of all major and



minor works, *oil*ing operations mosquito surveys etc. carried out during the year. Methods of *sewage* and *refuse disposal* in Town Board Areas remain much as described in previous issues of this Supplement. It is noted that the construction of a septic tank for the disposal of night soil in Segamat is under consideration. As regards *water supplies* preparations are being made for the installation of a new supply to Huang a comprehensive scheme for the Muar area is in progress and in Batu Pahat a chlorinating plant has been installed elsewhere no changes.

The routine inspection of *houses markets foodshops* was continued as formerly. Health Officers assisted by Health Inspectors continued to deal with matters of rural sanitation.

*Estate hygiene* received close attention and inspections were carried out with available staff in co-operation with the Controller of Labour. Recommendations for the improvement of lines, water supplies, etc., were usually carried out and in no case was prosecution necessary.

In Town Board Areas premises used for the *preparation and sale of food* were inspected and 2,009 licences were issued for premises complying with Health Department regulations. *Milk and dairy farms* were also inspected a great deal yet remains to be done to raise the hygiene standards of dairies in the State.

*Port Health Work.*—The majority of vessels calling at Johore Ports are local coastal traders and are not examined but during the year 22 sea-going ships from Japan entered Johore ports no cases of infectious diseases were recorded.

*Hospitals Dispensaries etc.*—The year was one of considerable building activity. The more important works mentioned are that the new Mental Hospital approaches completion, and additional accommodation was completed and brought into use in Johore Bahru extensions to the hospital at Muar were in hand, a new Women and Children's Clinic was completed in Batu Pahat while two new general wards and a maternity ward were under construction in Mersing. Minor constructional work was in progress in other areas. Accommodation available in Government Institutions and records of work carried out during 1936 read as follows —

Institutions	Beds	Admissions	Treated	Died
11 Hospitals	1 703	39 118	39 618	2,230
Mental Hospital	5'6	189	648	49
Lepet Asylum	250	126	249	18
2 Genl Hospitals	41	372	260	—
Totals	2,373	39,805	41 005	2,317

At the Government *Outdoor Dispensaries* and Special Clinics 88,366 new cases and 59 700 repeat cases were dealt with while the total of new out-patients treated at hospitals, dispensaries amounted to 174,075. In addition the *Motor Travelling Dispensaries* treated 93,863 out-patients.

The training of nurses has already been mentioned (see *Maternity Work etc.* above) but it remains to say that *hospital dressers* are trained

at the General Hospitals Johore Bahru and Muar and an examination held once a year. The notes which follow summarize references to the principal diseases treated during the year and commented upon in the Report under review.

**Malaria** patients treated in Government Hospitals numbered 5,923 (confirmed microscopically) and there were 189 hospital deaths due to this cause. In addition at Government Hospitals 1,838 cases of malaria unspecified with 37 deaths and 396 cases of unspecified fevers with one death were dealt with while Motor Travelling Dispensaries treated 3,304 malaria cases. At the 40 Estate Hospitals, 10,371 cases of malaria unspecified were treated with 83 deaths and 13,179 cases of unspecified fevers with 25 deaths. At Government Hospitals and Dispensaries 62,471 blood films were examined and 8,654 were found to contain malaria parasites among the positives 39 per cent were *subtertian* infections 37·6 per cent *benign tertian* 11·9 mixed infections and 1·8 per cent *quartan*.

No case of *cholera* or *plague* was reported. Rat trapping was continued and 6,270 rats were caught, none being found infected with *P. pestis*. Four persons were given anti-*cholera* inoculations prior to leaving for Mecca. There were four cases of *smallpox* with 2 deaths the first case occurred in a Chinese infant immigrant all three subsequent cases being infected from this child. During the year 28,533 vaccinations were performed. Five non-fatal cases of *tropical typhus*—all of the rural type—were reported, six fatal cases of *cerebrospinal meningitis* and 34 of *diphtheria* with 17 deaths.

The incidence of *enteric fever* was higher with 331 cases and 67 deaths. Of *dysentery*, 696 cases and 92 deaths were recorded and in addition Government Hospitals dealt with 573 cases of *diarrhoea* and 786 cases of *dysentery* and 1,993 of *diarrhoea*. Estate Hospitals also treated 19 deaths being ascribed to the former cause and 22 to the latter.

**Pulmonary tuberculosis** caused the deaths of 552 persons in the State as a whole and other forms of tuberculosis 33 deaths. In Government Hospitals 813 cases of pulmonary tuberculosis were treated and 271 patients died, the corresponding cases and deaths in Estate Hospitals being 92 and 11 respectively. *Pneumonia* is another serious cause of morbidity and mortality in Government Hospitals 923 cases and 368 deaths were recorded, and in Estate Hospitals 663 cases with 168 deaths.

**Leprosy**—At the Leper Asylum, Johore Bahru, where 250 beds are available 126 cases were admitted 18 died 82 absconded and 3 were discharged leaving at the end of the year 245 inmates still in this Institution.

**Beriberi** was the registered cause of the deaths of 374 persons in the State during 1936. At Government Hospitals 635 cases were treated and 67 patients died, and at Estate Hospitals 232 beriberi patients were dealt with and 13 deaths ascribed to this cause. *Influenza* was responsible for 1,666 non-fatal cases treated at Government Hospitals *chickenpox* for 182, *measles* for 55 *erysipelas* for 22, and *acute poliomyelitis* for 7 no death was ascribed to any of these causes.

Other diseases mentioned in the Report under review included the following—

Disease	Patients Treated		Deaths	
	Government Hospitals	Estate Hospitals	Government Hospitals	Estate Hospitals
Ankylostomiasis	1,236	3,259	13	6
Veneral Diseases	929	189	17	5
Laws	51	—	—	—
Ulcers	1,221	3,761	—	—
Violence (all forms)	2,374	?	57	?

*Scientific*—At all Government Hospitals and Dispensaries in the State, the 128,703 specimens examined included 62,741 blood films, 33,979 faecal specimens and 8,262 specimens of sputa, pus, smears, etc. Of the total examinations made 83,859 were carried out at the Laboratories of the General Hospitals at Johore Bahru and Muar and they included 40,756 blood films, 15,806 faecal specimens, 5,303 Wassermann and Kahn reactions and 2,578 Widal and other agglutinations. The results of blood film examinations have been mentioned in the notes on malaria above. Among 8,262 specimens of sputa, pus, etc. examined 1,982 gave positive results; among the positives were *Mycobacterium tuberculosis* 35.9 per cent, *Mycobacterium leprae* 10.1 per cent, *Neisseria gonorrhoeae* 20.8 per cent. Then among the 33,979 faecal specimens 17,362 gave positive findings; the latter including *ankylostoma* ova alone 25.3 per cent, *ankylostoma* and other helminths 12.5 per cent, *ascaris* ova alone 35.4 per cent, with other helminths 9.0 per cent, *trichuris* alone 13.0 per cent, and *E. histolytica* 1.2 per cent.

*Financial*—Expenditure on Medical Department Services during 1936 amounted to \$1,249,466, a sum which represents 7.7 per cent of the total revenue of the State during that year.

### Kedah (1936)

Kedah, a Malay State under British protection, lies on the west coast of the Malay Peninsula. It is bordered on the interior by Selangor and Perak, and includes the island of Langkawi and a number of smaller islands to the south. The mainland is about 105 miles long and about 65 miles wide at its widest part. Its area, including the Langkawi group of islands, is about 3,648 sq. miles.

*Vital Statistics*—The estimated mid-year population, and registered vital facts for the year under review may be tabulated as follows:—

Race	Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Malays	312,571	12,359	40.0	7,310	23.3	1,803	144
Chinese	89,840	3,617	43.1	2,033	24.3	497	137
Indians	52,61	1,928	36.7	1,073	20.4	528	170
Non-Arabics	623	8	14.4	3	3.2	0	—
Others	12,956	255	19.7	283	20.8	37	145
Totals	483,904	18,366	36.8	10,833	23.0	2,667	145

Data relating to population births deaths etc continue to be presented in great detail in a series of well-arranged tabular statements (see this *Bulletin* 1937 Supp pp 183\*-184\*) Deaths in early life are a feature in Kedah vital statistics approximately 45 per cent of the deaths at all ages occurred in the 0-20 age period.

The vital statistics of estates include the following facts —

(a) *European Holdings*

Race	Estate Popula- tion	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Malays	3 742	67	17.9	32	8.5	9	134
Indians	30 913	1,337	43.3	632	20.4	256	191
Chinese	1 177	15	11.1	22	18.7	7	538
Javanese	42	3	71.4	2	47.6	1	333
Others	142	—	—	3	21.2	1	—
Totals	36 016	1 420	39.4	691	19.1	274	193

(b) *Asiatic Holdings*

Race	Estate Popula- tion	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Malays	5,580	45	8.1	26	4.6	11	244
Indians	2,005	22	10.9	25	12.4	5	227
Chinese	3 017	39	12.9	17	5.6	5	128
Javanese	35	—	—	—	—	—	—
Others	82	—	—	1	1.2	—	—
Totals	10 719	106	9.8	69	6.4	21	199

On European holdings no appreciable change in the total population has occurred as compared with 1935 figures but on Asiatic holdings the numbers are fewer by over 2 000. Attention is again called to the unreliability of the returns from Asiatic holdings.

*European Officials* resident numbered 77 with an average number resident of 74. No invalidings were recorded but two deaths occurred.

*Maternity and Child Welfare Work*—The first step towards the creation of a properly organized Maternity and Child Welfare Service has been taken this aims at the establishment of a *Kampung midwifery service*. Pupil midwives are being trained at two of the State Hospitals the work will gradually be extended until a large number of qualified and Government-subsidized midwives are employed in all parts of the State moreover legislative measures will be introduced providing for efficient control of the activities of private midwives practising within the boundaries of Kedah.

Meanwhile a vast amount of valuable work continues to be accomplished by the Lady Medical Officer who is in charge of the female wards at the General Hospital the female sections of all outdoor dispensary work in North Kedah and the Malay Women's Clinic at Alor Star (see this *Bulletin* 1937 Supp p 185\*) Observing that the

figures cannot fairly be regarded as a true assessment of the real good achieved by the Lady Medical Officer in the course of her work, the following data are supplied —

	To Homes	Out patients General Hospital	Malay Women's Clinic	Town Dispensary Alor Star	Out-station Dis- pensaries
First Visits	428	868	427	2 465	482
Repetitions	1 036	1 044	785	3,209	231

Facilities for Government Hospital Midwives to attend outside cases have been considerably extended

*School Hygiene*—During the year 45 Malay schools were visited and the sanitary conveniences available at these institutions graded. At these schools, which have 5 414 children on the registers, 4,690 were medically examined, the principal defects noted being *dental caries* 17.6 per cent *skin diseases* 9.3 per cent. *enlarged spleens* 6.4 per cent. Nineteen non Malay schools were also visited at the request of the Registrar of Schools at these institutions, with 364 children on the registers, 189 were medically examined *dental caries* 29 per cent. *skin diseases* 7 per cent. and *enlarged spleens* being the principal defects noted. During the year Professor E. K. TRATMAN of the College of Medicine Singapore carried out an investigation of the oral condition of kampong people in remote areas among those examined were a number of children. The findings are of great interest and his Report is reproduced as an Appendix to the Annual Report under review.

A Dental Clinic is to be established in a new building in course of erection at Alor Star. A qualified dentist will be in charge and while attention will be mainly directed to the requirements of school-children, visits to all parts of the State will also be organized.

Reference is made to the results of the special inspection of 9 schools made during the course of a *Health Survey* and the reader is referred to "Appendix A (page 33)" No details of this work are supplied, the final results being embodied in a report separately published.

*Public Health Sanitation etc*—In March 1936 Dr J GRAY State Surgeon (see this *Bulletin* 1937 Supp. pp 183\*-184\*) proceeded on leave prior to retirement and was succeeded by Dr J PORTIELLY as State Surgeon, Kedah. The year under review saw several important innovations which should have beneficial results in the future. The four administrative Public Health Districts were reorganized as three Divisions, viz. North, Central and South Kedah each under the charge of a Medical Officer who becomes responsible for all health duties within the boundaries of his territory (see this *Bulletin* 1937 Supp. p 185). The nine Sanitary Districts covering the main population centres remain. Malaria control work was extended four fold, dispensary services were increased, while maternity and child welfare work, and the establishment of a Dental Clinic were among other activities brought into being (See *Maternity Work and School Hygiene* above.)

As regards *sewage* steps were taken to ensure, wherever possible, that every house including kampong houses was supplied with a

Sanitary Board latrine all pit-latrines are now said to have been closed. Consideration is being given to improving methods of removal of night soil bucket-washing etc. The *water supplies* of the State received special attention, and action was taken to improve existing supplies, only one of which is filtered and chlorinated. Only eight of the largest towns and villages (and the rural population living along the pipe lines) receive piped supplies the many areas without adequate and safe drinking water are receiving consideration.

*Labour conditions on estates in mines etc*—Medical Department activities in this field of work were fully maintained 895 visits of inspection being paid to 427 out of the 523 estates on the register. So far as *European holdings* are concerned the Report deals in some detail with such matters as housing water supplies sewage disposal, anti-malarial work etc. Less information is presented relating to *Asiatic holdings* in some cases it was necessary to institute legal proceedings in order to enforce orders for the improvement of existing conditions.

A Quarantine Station is maintained at Padang Besar where all immigrant labour from Penang is dealt with. During the year 12,753 passengers were examined.

*Hospitals Dispensaries etc*—A new Town Dispensary at Alor Star and a new admission ward with dispensary and laboratory attached at the District Hospital Kulim were completed during the year for the rest medical institutions remain as described in previous issues of this Supplement (thus *Bulletin* 1935 Supp p 177\* 1936 p 181\* and 1937 p 186\*). It is stated that the Outdoor Dispensary Service is to be considerably extended and more dressers employed. The record of work accomplished at the various centres may be tabulated as follows —

Hospital	Beds	In patients		Out-patients		Total
		Number treated	Hospital Deaths	New Cases	Repetitions	
Alor Star	300	6,555	296	9 120	2,366	11,388
Sungei Patani	285	5,968	320	6 068	529	6,597
Kulim	200	4 499	232	7,222	1 613	8,835
Baling	28	387	12	3 946	779	4 725
Langkawi	63	673	34	3 573	662	4,265
Prison Sick Wards						
Alor Star	?	79	—	1,225	4,910	6,135
Sungei Patani	?	—	—	303	1,211	1,514
Totals ..		18 160	894	31 437	12,000	43 457

At the nine Dispensaries 34 647 new cases and 15 548 repetitions were dealt with while the four *travelling dispensaries* recorded 23,203 new cases and 3,543 repetitions.

As regards the racial distribution of hospital in-patients Indians accounted for 45.0 per cent. Chinese 40.7 per cent Malays 12.8 per cent and the remaining 1.5 per cent all other nationalities together. The percentages of prevailing diseases among these patients read malaria 20.9 wounds and injuries 10.2, ulcers 6.4 respiratory diseases 5.6 ankylostomiasis 4.4 pulmonary tuberculosis 2.4 venereal diseases

1-9 the following notes relate to some of the principal morbid conditions discussed in the text of the Report.

Persons suffering from *malaria* and treated as in patients at the various hospitals in the State constituted one-fifth of the total patients treated for all causes of ill-health. Recorded deaths due to the disease numbered 1 198 but "*fevers unspecified*" were responsible for 3 701 deaths in other words malaria alone caused 12 per cent. of the deaths due to all causes but if "*fevers unspecified*" are included these titles were responsible for 47 per cent of the total deaths in the State during 1936. Of the malaria situation in the State as a whole little can be said for no detailed information is supplied other than that 3,800 cases of the disease were treated at the various State hospitals. A special Health Survey and investigation of malaria in ricefields was undertaken and a report by Dr W J VICKERS who directed these enquiries is said to be presented in Appendix A of the Annual Report. It has been pointed out that owing to some mischance this Appendix has been omitted (see section *School Hygiene* above).

The *Anti Malarial Department* (see this *Bulletin* 1937 Supp. p. 186\*) carried out control work in the three largest towns certain areas elsewhere were subsoiled and rural populations dealt with by drug prophylaxis. Mosquito dissections increased from 1,343 in 1935 to 9,805 in 1936 while blood examinations which were negligible in 1935 numbered 11,506 during the year under review.

On estates reported cases of malaria and unspecified fevers totalled 10,390 with 111 deaths. Of the total cases recorded 9,529 occurred on European holdings among an aggregate population of 36 018. Although the population on Asiatic holdings declined by about 2 000 more cases were notified than in 1935 it is suggested that the increased numbers indicate better notification. It is pointed out that whereas on European holdings only one malaria patient in 1 000 died on Asiatic properties the case fatality rate was 23 per 1 000.

*Cholera* has not been observed for some years yet it is endemic in Sum and therefore remains a constant menace a constant watch is maintained at the Quarantine Station (q.v. above). No case of *smallpox* has been reported in the State since 1932. In order to ensure that the population is sufficiently protected the entire vaccination procedure is being reorganized. During the year 15 177 vaccinations were performed, 88 per cent being reported successful. No case of *plague* has ever been notified as anti-rat measures, steps were taken to improve the condition of food and storage premises refuse disposal etc.

Among other communicable diseases recorded occur 3 non fatal cases of *tropical typhus* 103 of *chickenpox* and 22 of *measles*. There are also 39 cases of *enteric fever* with 15 deaths, 315 of *dysentery* and *diarrhoea* with 220 deaths, 970 of *influenza* with 58 deaths and 12 of *diphtheria* with 8 deaths. No commentary is supplied to any of these manifestations.

Other diseases appearing in the Returns but lacking textual comment include the following. *Pulmonary tuberculosis* caused the deaths of 166 persons 162 deaths occurred among 430 hospital in-patients. *Pneumonia* was responsible for 554 cases and 207 deaths. The number of cases of *puerperal fever* is not given but 291 women succumbed to this cause.

*Helminthic diseases* pass unnoticed in the text yet during the year 326 deaths were ascribed to *ankylostomiasis* among the population at large and according to Hospital Returns 801 in-patients were treated for the infection during the year.

In the State as a whole the deaths of 206 persons were ascribed to beriberi. The numbers receiving hospital treatment for this condition are not stated but mention is made of an investigation into the relative values of the various common remedies used in beriberi. One particular line of treatment will be investigated at the Hospital in each of the three main divisions of the State this enquiry continues.

*Leprosy*—Kedah lepers accommodated in the four institutions outside the State at the end of the year numbered 178 admissions during the year totalled 51 two were discharged seven absconded and 22 died.

Mention of *venereal diseases* is confined to the statement that 339 cases (undifferentiated) received hospital treatment and 16 died and that in the State as a whole 41 deaths were ascribed to *syphilis*. At the Government Pathological Laboratory 3 648 Kahn and Wassermann tests were carried out in no case are findings supplied.

*Special Reports*—The Report of Professor E. A. Tratman relating to the oral conditions of *kampung* people in comparatively inaccessible parts of the State has been referred to in the section *School Hygiene*. Attention has also been directed to the regrettable omission of the second Special Report concerned with a Health Survey of the State and a Special Malaria Investigation.

*Scientific*—At the five Kedah Hospitals 55,932 specimens were examined during the year the nature of these and findings recorded are not stated. At the Government Pathological Laboratory where 8,912 specimens were examined 3 648 were for Wassermann and Kahn tests only 142 blood films and 15 faecal specimens for ova were examined. No results of these examinations are supplied.

*Financial*—Medical Department expenditure during 1936 amounted to \$491 133 an increase of \$10,516 over 1935 expenditure.

### Perlis (1936)

Perlis is the most northerly of the Malay States lying on the west coast of the Malay Peninsula. It is bordered on the interior by Siam to the north and Kedah to the south, and has an area of about 316 sq. miles.

*Vital Statistics*—The estimated mid year population and registered vital facts for the year under review are as follows—

Race	Population	Live Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Europeans	8	—	—	—	—	—	—
Eurasians	5	—	—	—	—	—	—
Malays	42,816	1,520	35.5	—	—	—	—
Chinese	6,172	284	42.8	727	16.9	161	105.9
Indians	975	30	30.8	229	37.1	41	155.3
Others (mostly Siamese)	—	65	27.8	18	16.4	2	66.7
Totals	51,851	1,869	36.0	1 019	23.8	14	254.5
					19.6	216	116.6



In addition to the live births 92 *stillbirths* were recorded. The increase in the numbers of births and deaths registered is interpreted as evidence of steady realization by the public of the importance of this requirement.

*European Officials* resident numbered three no invalidings or deaths. *Asiatic Officials* resident numbered 306 with the same average number resident two were invalided.

Of the four *Estates* three are owned by Asiatics and one by Europeans. On these properties labourers numbered 314 and their dependents 121 making a total of 435 persons. Seven deaths were recorded, and among the Indian population (comprising 385 persons) 21 births occurred.

*Maternity and Child Welfare Work*—A scheme for the training of local midwives was inaugurated and the first pupil selected commenced training in October. Prospective candidates are to be drawn from the *kampongs* to which when qualified, they will return as Government subsidized Midwives. During the year under review the Hospital midwife attended 10 confinement cases at the homes of patients.

*School Hygiene*—The regular fortnightly visits by the Travelling Dispensary to the 16 schools in the State were continued. The Assistant Medical Officer also visited the 20 Malay Vernacular Boys Schools and examined 2 055 of the 2,610 pupils on the registers. The results of his examinations show that 58 per cent. of the pupils showed dental defects 27.7 per cent. had enlarged spleens 12.5 per cent. were suffering from scabies or other skin affections and 1.3 per cent. from *virus* for the latter infection 48 children received N.A.B. injections.

*Public Health Sanitation etc*—Steady progress in the measures taken to improve sanitary conditions in the State is reported. The four principal villages—Kangar Arau, Kaki Bukit and Padang Besar—are Sanitary Board areas. As regards *sewage disposal* all villages use the bucket system of removal and trenching of night-soil. It is now obligatory for every house-owner to use the standard pail and to build latrines according to the officially approved designs. *Refuse* is disposed of by incineration or burial. Piped *water supplies* are available in Kangar Arau and Padang Besar. Water supplied to the first two of these villages is filtered but otherwise untreated and is said to be satisfactory as to quality. Padang Besar supplies which are obtained from a surface lake are liable to dangerous pollution. a filtration plant is to be installed. The provision of pure water supplies to other villages is receiving Government attention.

Energetic measures are being taken to improve the sanitary conditions of certain villages. it is proposed to entirely remove Kaki Bukit to a new and healthier site. The usual antimalarial measures were carried out in the Sanitary Board areas.

*Hospitals Dispensaries etc*—New buildings and works completed during the year included the construction of an Outdoor Dispensary at Kaki Bukit a ward for phthisis patients two Malay huts within Kangar Hospital grounds installation of electric light at the Hospital etc. Medical institutions in the State comprise a State Hospital at Kangar with Outdoor Dispensary Outdoor Dispensary at Kaki Bukit railway outdoor dispensary at Padang Besar (administered by the Railway Authorities) a Travelling Dispensary. *In-patients* treated numbered 1 667 distributed as to 984 Chinese 454 Indians, 242

Malays and 7 others 109 hospital deaths were recorded 38 of these occurring within 48 hours of admission. New cases among Outpatients at the Kangar Hospital numbered 6,958 and at the Outdoor Dispensary Kaki Bukit (opened on November 14th) 1,069. The Travelling Dispensary dealt with 1,579 cases exclusive of those treated at schools police stations etc.

*Malaria* and *unspecified fever* continue to exact a high toll of sickness and mortality out of the total of 1,019 deaths due to all causes 27 were ascribed to *malaria* and 447 to *unspecified fever* deaths under the latter title showing an increase of 20 per cent over 1935 records. There was a further increase in the number of hospital in-patients treated for *malaria* 394 (in another place *malaria* cases given as 411) as compared with 356 in the preceding year. Types of infection are not differentiated. At the Laboratory where 3,390 blood films were examined 769 were found to contain *malaria* parasites the percentage findings being *benign tertian* 53.2, *subtertian* 36.9, *mixed infections* 9.5 and *quartan* 0.4 per cent. Among 2,038 specimens of nopheline larvae collected during the year *A. kochi* accounted for 32 per cent, *A. vagus* 24.1, *A. barbirostris* 23.4 and *A. kirtzianus* 10.6 per cent.

Two fatal cases of *cerebrospinal fever* (Chinese running coolies) appear among Hospital records. The usual preventive measures were taken. There were also two non fatal cases of *diphtheria*. Six cases of *enteric fever* were admitted to Hospital two died. Outside the Hospital cases 8 other deaths were attributed to this cause. *Dysentery* gave rise to 16 non fatal Hospital cases 14 were amoebic, the State as a whole two deaths were ascribed to dysentery but none *shierhoka* and *enteritis*.

Hospital cases of *pulmonary tuberculosis* numbered 44 with 12 deaths. Cases were admitted during the year under review. In the State as a whole 41 deaths were ascribed to the disease. Hospital cases of *pneumonia* totalled 62 with 29 deaths and of other lung complaints 99 with 10 deaths.

Amely-six cases of *ankylostomiasis* received treatment with 5 deaths as compared with 56 cases and 3 deaths during 1935.

*Rabies*—Seventeen cases of dog-bite were reported during the year. Of the 20 dogs concerned 16 were declared non rabid after observation. The brains of 3 were unknown strays one dog was killed on the spot. The brains of two dogs were sent to the Institute of Medical Research Kuala Lumpur both were declared positive for rabies. Of the four persons bitten by rabid or suspected dogs one could not be traced one refused treatment two were treated at Alor Star Hospital, Kedah. The usual antirabic measures were enforced.

Other diseases mentioned in the Report include 50 cases of *venereal diseases* (unspecified) 25 of *chickenpox* 3 of *measles* and a number of *influenza*. Among the principal causes of death in the State other than those already mentioned appear *infantile convulsions* 150 and *schistos* 40 deaths.

*Scientific*—At the Laboratory the 6,667 specimens examined included 3,390 bloods (referred to in section *malaria* above) 1,769 sputum samples of urine 285 samples of sputum the percentages of positive findings being for blood films (*malaria parasites*) 100.

22.7 faecal specimens (helminths) 66.5 sputum (tubercle bacilli) 11.3 and urines 9.3 per cent

*Financial*—Medical Department expenditure during 1936 amounted to \$29,634. What ratio this bears to the total revenue or expenditure of the State is not mentioned.

### Kelantan (1936)

The State of Kelantan is on the eastern side of the Malay Peninsula. On the north is the China Sea, on the south Pahang, on the east Trengganu and the China Sea, on the west Perak and Siamese Territory. The area is estimated at 8,720 sq. miles, or rather less than that of Yorkshire.

*Vital Statistics*—The method formerly used for estimating the annual population (see this *Bulletin* 1936 Supp. p. 184\*) has been abandoned for as no reliance could be placed on immigration and emigration figures results were found to be most inaccurate. For the year under review the geometric method of estimation has been applied, and results in a total estimated population of 395,817 distributed as to 355,495 Malays, 20,801 Chinese, 11,753 Indians, 78 Europeans, 44 Eurasians and 7,646 Others. The method has also been used for the recalculation of the population for each of the years 1932–1935 with results differing from those presented in the Annual Reports for those years.

*Registration* of births and deaths which became compulsory only in 1930 is still very unreliable. During the year 11,652 births and 8,558 deaths were registered, giving crude birth and death rates of 29.4 and 21.4 per 1,000 for all races respectively. The racial distribution of birth rates reads Malays 30.1 Chinese 29.8 Indians 12.7 Europeans 12.8 Eurasians 22.7 Others 21.5 and of death rates Malays 22.0 Chinese 18.4 Indians 10.0 Europeans 25.6 Eurasians nil and Others 16.2.

There were 1,520 infant deaths giving an infant mortality rate of 130.1 per 1,000 live births.

*European Officials* resident numbered 28 with the same average number resident, no deaths or invalidings were recorded. *Non-European Officials* resident and average number resident numbered 1,012, ten were invalided and two died.

*Estates* had a total labour force with dependants of 3,007 and of these 1,639 were Indians. Among the total estate population 60 deaths occurred giving a crude death rate of 19.6 per 1,000. Among the Indian community births numbered 66, deaths 45 and infant deaths 11, the resulting birth and death rates were 40.2 and 27.5 per 1,000 respectively and the infant mortality rate 166.7 per 1,000 births.

*Maternity and Child Welfare*—Maternity beds are available at the Kota Bharu Hospital for Women and though every effort is made to induce women to take advantage of available facilities Malay women are slow to respond, at this Hospital where 116 deliveries were conducted there were only three Malay patients. Estate managers have been invited to send expectant mothers to the hospital for pre-natal treatment and delivery, the response has been fair.

So far the training of midwives has not been undertaken in the State but a scheme for the training of local '*bidans*' has been approved and will be implemented suitable candidates may be hard to find since 95 per cent of Malay women are illiterate.

As regards *infant welfare work* mothers are encouraged to bring their children to the clinic at the Women's Hospital and during the year 211 infants made 310 attendances. The Health Nurse visits newly born infants, mothers and young children in their homes in the town of Kota Bharu and the adjacent kampongs. These visits totalled 626 to newly-born infants, 1 549 to mothers and 159 to children that old customs and prejudices are gradually being overcome is clear from the fact that out of a total of 2 334 visits to homes 1 488 were to Malay homes.

Premises are being equipped and a qualified Lady Medical Officer has been appointed to take charge of an established Infant Welfare Centre work will commence in 1937.

*School Hygiene*—Out of the 60 Malay Vernacular Schools in the State 47 with 4,879 children were inspected results recorded on school cards and a list of pupils in need of treatment given to teachers so that the travelling dressers can deal with such cases over 80 per cent. of the schools being covered by the travelling dispensaries. The general health and cleanliness of the boys was found to be satisfactory. *Dental caries* was commonly met with *spleen rates* in areas where anti malarial measures are in force are low but in other areas as high as 7.4 per cent. Minor skin ailments are common but only 10 cases of *active jays* were seen in the 4,879 pupils examined. A special look-out was kept for cases of malnutrition only a few isolated cases were encountered and in these improper rather than underfeeding worm infestation and malaria appeared to be the responsible causes.

The sanitation in schools except those in towns is described as primitive efforts are being made to effect improvements.

*Public Health Sanitation etc*—The general health of the State was good and Kelantan remained free from any serious epidemic outbreaks. It is pointed out that the official vital statistics provide no reliable index of the state of the public health and that as Deputy Registrars have little if any knowledge of medicine the registered causes of death except among hospital patients are untrustworthy.

With regard to *sewage disposal* sanitation in kampongs and rural villages is still very primitive and where latrines exist they are generally of the shallow pit type and more often than not adjacent to sources of water supply. In the notified areas the single bucket system is mostly used disposal being by trenching out but there is room for considerable extension of the system.

In the small villages and rural districts rivers streams and more commonly unprotected wells are the main sources of *water supplies* but in the larger villages and towns wells are protected. Kota Bharu alone has a piped supply which though entirely untreated gives most satisfactory results on both chemical and bacteriological analyses. Schemes are under consideration with a view to providing Pasir Mas and Kuala Krai with piped supplies.

As regards *Estates* the new Labour Code which became law during the year enables the authorities to exert pressure to ensure improved housing and sanitary conditions for employees.

In the larger notified areas housing and town planning schemes receive the considered attention of the responsible authorities and improvements are gradually being effected. Detailed sanitary surveys are carried out in the villages and every opportunity taken to improve housing and sanitary conditions of the kampong type of house.

Inspection and control of food continues to be carried out by members of the Health Staff. The Veterinary Inspector supplies, in a separate Report details of the work accomplished during the year.

No facilities exist for the training of sanitary personnel but all Sanitary Inspectors in the State hold the Diploma of the Royal Sanitary Institute.

*Port Health Work*—There is nothing new to add to previous descriptions of this work (see this *Bulletin* 1937 Supp. p. 192\*) except to say that 229 passenger steamers with 270 passengers called at Tumpat during the year.

*Hospitals, Dispensaries, etc.*—The hospitals and dispensaries maintained by Government (see this *Bulletin* 1937 Supp. p. 192\*) continued to function. In December a new ward of 30 beds was completed at the Kota Bharu Hospital. Two other wards of similar size are in course of construction.

The success of the travelling dispensaries has justified their further expansion. New units were brought into use for the first time in the Ulu Kelantan District, Tumpat District and Pasir Puteh Kemuning and Temangan. Provision has also been made for the purchase of a second motor boat for river work.

The work carried out at these centres during the year can be tabulated as follows—

	Admissions	Total Treated	Deaths	Out patients	Attendances
Hospitals	8,348	8,557	248	43,889	60,070
Dispensaries	—	—	—	35,370	60,983
Travelling Dispensaries	—	—	—	—	190,118

According to the Hospital Returns the most prevalent diseases treated during the year in order of numerical importance were malaria, *adenitis*, skin diseases, venereal diseases and pulmonary tuberculosis. The notes which follow briefly refer to these and other diseases commented upon in the Report.

A marked increase in malaria admissions is noted. The increase is largely attributed to the fact that during the year a new iron mine was opened in a highly malarious district by a Japanese firm who imported unacclimatized Chinese labour chiefly from Northern China. Admissions to Government Hospitals totalled 1,385, total treated 1,409 and malaria deaths 61. Malaria admissions constituted 28 per cent. of total admissions for all causes of sickness during 1938. Of the 1,409 cases treated 228 were benign tertian, 41 quartan and 852 sub-tertian infections, 6 were mixed infections, 91 cachectic, and in 168 cases the type of infection was not defined.

Five non-fatal cases of blackwater fever received in-patient hospital treatment.

To the seven *Estate Hospitals* 461 persons were admitted suffering from malaria (undefined) and 13 died.

In connexion with malaria records it may be stated that during the year in the State as a whole 78 deaths were ascribed to *malaria*, 70 to *fever unspecified probably malaria* and 4 411 to *fever unspecified*.

Anti-malarial work energetically carried out included the laying of new concrete and earth drains oiling etc. but control is difficult in many parts of the hilly country where breeding of *A. maculatus* is widely distributed. During the dry season some of the rivers become a series of pools in which *A. barbirostris* are found breeding in large numbers yet these pools are often inaccessible to the oiling gangs owing to the presence of heavy jungle. At the Hospital Laboratories 5 343 blood films were examined for the presence of malaria parasites but results are not given.

No case of *plague tropical typhus* or *cerebrospinal meningitis* occurred. *Cholera* was absent but in view of the proximity of Siam is always regarded as a menace. All trains and boats arriving from Siam are met and passengers examined and during the dry weather wells are regularly pinked 1,206 anti-cholera injections were given to Mecca pilgrims. No case of *smallpox* was recorded but vaccinations continued to be carried out as in previous years at hospitals dispensaries and by travelling dressers and vaccinators 12 451 vaccinations were performed during the year.

One fatal case of *diphtheria* appears in the Hospital Returns. The Report refers to 17 cases with one death due to *enteric fever* and then goes on to say Of these 4 were prisoners 5 from Kuala Krai and 12 from Kota Bharu —making a total of 21. The source of infection was untraced in any of these cases. Of *dysentery* it is said 144 cases admitted to hospital though Hospital Returns make mention of only 104 admissions and 106 treated. Of the 104 cases admitted, 74 showed the presence of *E. histolytica* on stool examination. Five outbreaks of bacillary dysentery were reported from kampongs none of which was serious. It may be noted that dysentery deaths in the State as a whole numbered 7 but also 334 deaths were ascribed to *diarrhoea and enteritis*.

*Pulmonary tuberculosis* is said to be much more prevalent than hospital records suggest for cases are rarely seen except in the advanced stages. Bad housing overcrowding chronic malaria ankylostomiasis adverse climatic conditions during the north-east monsoon and scarcity of suitable diets are predisposing causes. During the year 192 cases were treated in Government Hospitals and 45 died. For the future all Government servants will be required to undergo an annual examination for pulmonary tuberculosis.

In the seven *Estate Hospitals* 239 persons were treated for *lung diseases* and 13 died while in the State of Kelantan as a whole 87 deaths were ascribed to *phthisis*. Hospital cases of *lobar and broncho-pneumonia* numbered 126 with 48 deaths and of acute *bronchitis* 100 with one death.

*Leprosy* is said to be not uncommon among Malays in Kelantan. A tendency persists for relatives to conceal victims and when search is made for reported suspects it is a common practice for them to avoid discovery by slipping over the border into Siam. The accommodation for lepers in the State consists of a small camp for 12 patients near

Tumpat. To this camp 6 were admitted 16 treated 4 absconded, one died and one was discharged during the year. Treatment consists of weekly injections of Moogrol E.C.C., Chaulmoogra Oil externally and Tai Fong Chee and Iodich orally. Fourteen cases were diagnosed in the State during the year and of these 6 were Malaya. When the numbers become too large for available accommodation, cases are transferred to Pulau Jerejak or Sangei Buloh (see this *Bulletin* 1936 Supp. p. 158\* and p. 166\*).

There are no special venereal diseases clinics but facilities for treatment are provided at all hospitals and dispensaries although sufferers are disinclined to submit to a full course of treatment or any treatment whatsoever. During the year 2,885 new cases attended for treatment, and Hospital Returns show 138 cases of syphilis 213 of gonococcal infections and 10 of soft chancre. The figures must be accepted with some reserve owing to their considerable incompleteness but it can be said that incidence is increasing especially in the larger villages and in Kota Bharu, the capital. Attendances for treatment of years totalled 26 755 the increase in the number of attendances is not to be regarded as indicating increased incidence of the disease but is due to the extension of travelling dispensary facilities and the popularity of treatment among the Malays.

The only reference to helminthic diseases occurs in the tabulated Hospital Returns where it is noted 960 patients were treated for *ankylostomiasis* 163 for *ascariasis* and 15 for other helminths. Other diseases calling for mention include *beriberi* (including epidemic dropsy) for which condition 39 patients received hospital treatment and 8 died the disease is not common in Kelantan owing to the fact that local rice which is undermilled is generally used. Of the 464 patients treated during the year for injuries etc. produced by external causes 447 were due to wounds resulting from assaults the majority caused by knives parangs etc. and only 31 by fists. There were 91 cases of *mumps* 11 of *chickenpox* and 10 of *measles* treated in Government Hospitals. *Scientific*—At the Hospital Laboratories 14,325 specimens were examined. These included 5,343 blood films for malaria, 4 680 faecal specimens 3 002 urines 587 sera for Kahn tests. The results of these examinations are not given. *Financial*—Expenditure on medical services amounted to \$181,208 a sum which represents 7.3 per cent. of the total expenditure of the State during 1936.

### Trengganu (1936)

The State of Trengganu lies on the eastern seaboard of the Malay Peninsula 4° and 5° N. lat. and 102°20' and 103°30' E. long. It has an area of 5 050 sq. miles.

*Vital Statistics*—The estimated mid-year population for 1936 was 165 170. Registration has now been extended there now being 41 Deputy Registrars (see this *Bulletin* 1937 Supp. p. 195\*) of which 28 are stationed at Police Stations, 3 at Customs Offices, and 10 are

District Headmen. Registered births numbered 7 105 and deaths 4 683 the resulting birth and death rates being 36.5 and 24.0 per 1 000 persons living. Births are tabulated with distinction as to sex and race and deaths by race, sex and in age-groups. Causes of death are unreliable—less than 3 per cent. are medically certified. Of 2,661 deaths ascribed to unspecified fever and malaria only 136 were due to malaria. During the year 2,356 deaths were recorded as due to *deman panas* or hot fever.

Infant deaths totalled 1 514 giving an infant mortality rate of 213.1 per 1 000 births—the rate for Malays alone is given as 216.8 per 1 000 births—a rate which though high is actually lower than the corresponding rate for some other areas in Malaya.

Of the 37 Europeans resident in the State 21 were European Officials the latter showing an average number resident of 13. No invalidings or deaths were recorded among Europeans.

On Mines and Estates the average labour force employed throughout the year numbered 4 084 and their dependants 1 432. Among these 77 deaths were recorded—19 being due to malaria and 18 to injury (8 were killed in a riot). Particulars are supplied also for three other properties from which returns were received for less than a year. These concerns had an average of 980 labourers employed with dependants totalling 193. Deaths numbered 23.

Maternity and Child Welfare Work.—During the year under review 64 women died in childbirth giving a maternal mortality rate of 9.0 per 1 000 live births for all women and a similar rate for Malays alone. As these rates are said to be reliable they can be regarded as reflecting the efficacy of native midwifery—only 248 out of 7 105 births were attended by qualified midwives.

There are now 6 qualified midwives in the service of the Medical Department and one employed by the Nippon Mining Company. At the Kuala Trengganu Hospital 64 confinements were conducted and no maternal deaths were recorded—only 7 of these confinements were Malay women. In addition 159 women were delivered in their homes. Of the latter the midwife attached to the Kuala Trengganu Maternity and Welfare Clinic conducted 92 cases (42 were Malays), the midwife of Kemaman 48 (all Chinese), the midwife at Besut during the last seven months of the year dealt with 14 cases (13 Malays) and the midwife at Kuala Dungun in two months delivered 5 Chinese women successfully.

At the Kuala Trengganu Welfare Clinic ante-natal visits numbered 84, children treated under one year of age 169 and other children 1,243. With the help of the four District Midwives it is hoped to build up a child welfare service in those areas.

School Hygiene.—Twenty-two Government schools and 5 private schools were inspected and 2,309 children medically examined by Assistant Medical Officers and senior dressers during the year. 1,294 of the children were in schools in Kuala Trengganu. The principal defects noted were intestinal parasites 78.6 per cent. (in one area only 2 out of 114 faecal specimens were negative), dental caries 62.2 per cent., yaws 10 per cent., ulcers 7.3 per cent., scabies 5 per cent. and splenic enlargement 2.8 per cent. (see this Bulletin 1937 Supp. p. 196\*).

Public Health Sanitation etc.—Additions to the staff of the Medical Department include 2 Assistant Medical Officers, 5 dressers, one nurse



(who is also a qualified midwife) 2 midwives, and one qualified sanitary inspector. In the large towns steady progress is reported in organization designed to improve sanitary conditions. There are now 4 Town Boards and outside these areas sanitation is controlled by Malay District Officers, with the exception of Beaufort where the State Commissioner North Trengganu is in charge.

As regards *sewage disposal* the Town Boards are taking steps to improve existing conditions otherwise conservancy methods remain for all practical purposes, as previously described (see this *Bulletin* 1937 Supp. p. 196\*). Although a few insanitary wells were demolished during the year water supplies continue to be drawn from shallow wells (mostly unprotected) and rivers.

Building plans have to receive the sanction of the Town Board before work can be commenced. In other areas there are no building regulations. The routine inspection of houses was continued and a number recommended for demolition. Foodshops, bakeries etc. have to be licensed and have to be regularly inspected by Officers of the Medical Department.

*Labour conditions*—Mining concerns employ medical men or qualified dressers all increased the number of their sanitary coolies during the year. Bore-hole latrines were constructed and conditions generally improved. On the Estates new coolie lines were built and other steps taken to improve living conditions.

*Port Health Work*—The outbreak of cholera in Siam persisting (see this *Bulletin* 1937 Supp. p. 197\*) the examination of passengers and crews arriving in ships from that country continued. A number of junks trading between the State and Siam were also examined.

*Hospitals Dispensaries etc*—Available in-patient hospital accommodation in the State remains unchanged (see this *Bulletin* 1937 Supp. p. 197\*) but it is noted that two small hospitals are in course of erection. At the Government hospital at Kuala Trengganu it is stated 2,418 patients were admitted during the year that of the total 1,062 were Malays, the latter including 236 female Malays. Deaths numbered 81 but 9 of these occurred within 48 hours of admission. [Hospital Returns record 2,450 patients admitted, 2,583 treated and hospital deaths 82.]

A chain of dispensaries is established along the coast while travelling dressers, vaccinator, customs, and police stations etc. supply the needs of the population in the interior (see this *Bulletin* 1937 Supp. p. 197\*). New cases dealt with were—

By dispensaries and travelling dressers	113 050
By vaccinators	16,992
At customs and police stations	1 047

In an Appendix to the Report details are tabulated for each of the various dispensaries.

The Nippon Mining Company maintains its own hospital and dispensary. Hospital accommodation is also provided on two of the Estates for their employees.

Records of mortality being more trustworthy with regard to fact than to cause of death (see above *Vital Statistics*) the only reliable information concerning the incidence of disease in Trengganu is to be obtained from records of patients treated by the Medical Department.

the notes which follow briefly summarize the principal items of hospital and dispensary experience during 1936

*Malaria* incidence increases with distance inland from the coast (see this *Bulletin* 1937 Supp p 198\*) At the Government hospital, Kuala Trengganu 401 in patients were dealt with (389 admitted during the year) distributed as to *benign tertian* 69 cases *quartan* 24 *sub-tertian* 111 *mixed infections* 31 *cachexia* 7 and unclassified 159 there were 5 hospital deaths ascribed to malaria. The absolute numbers of out patients treated for the disease are not mentioned but it is stated that malaria accounted for 13.4 per cent. of all cases treated by Government dressers.

Among the employees of the five mining concerns 852 cases of malaria with 19 deaths were reported while among labourers on the Jabor Valley Estates 360 cases of malaria and 737 of unspecified fevers were recorded. Mention has been made of the fact that more than half the total deaths recorded in the State in 1936 were stated to have been due to *deman panas* it is pointed out that though this term is generally assumed to refer to malaria in Trengganu deaths have frequently been ascribed to hot fever in places where cases of malaria are exceedingly rare.

At the Hospital Laboratory where 3 170 blood films were examined *P vivax* infections accounted for 241 *P falciparum* 167 *P malariae* 31 and mixed infections 41 At Out-stations 147 out of 594 bloods examined were positive for malaria parasites the distribution of types of infection being *P falciparum* 79 *P vivax* 64 *P malariae* 3 and one with mixed *P falciparum* and *P vivax*

No case of *cholera* *plague* *cerebrospinal meningitis* or *smallpox* was reported primary vaccinations numbered 11 620 and re-vaccinations 1 154 making a total of 12,774

Four cases of *tropical typhus* were treated at the Kuala Trengganu Hospital with one death. The Weil Felix reaction was applied to the blood serum of 23 patients in 4 cases specimens agglutinated positively to *Prot vulgaris* K and 2 to *Prot vulgaris* "W"

Twelve cases of *enteric fever* were reported 8 patients were admitted to hospital and 3 died. At the Laboratory where 29 Widal tests were performed 12 agglutinated positively with *Bact typhosum*. For *dysentery* 44 patients were treated in hospital with 3 deaths among these in-patients 15 were amoebic cases, 1 bacillary and in 18 cases the type of infection was not defined. There were also 169 out-patient cases 64 of these being amoebic. It is said that sporadic cases of amoebic dysentery are reported from the mines during the year among employees of the Nippon Mining Company there were 39 cases with 2 deaths It may be noted that in the State as a whole 172 deaths were ascribed to *bowel diseases* during the year under review Nineteen out of 2,883 faecal specimens examined contained the protozoon *E histolytica* and 7 *Balantidium coli* At Out-stations out of 734 faecal specimens 30 contained *E histolytica*

Of the 140 persons whose deaths were ascribed to *respiratory diseases* 51 were said to have died from *pulmonary tuberculosis* At the hospital where 60 in-patients were treated for tuberculosis (all forms) with 23 deaths 58 (49 admitted during the year) were suffering from the pulmonary form of the disease and 21 died. There is said to be no overcrowding among the Malays in the State most of the cases being

A year ago we had pleasure in calling attention to the interesting notes concerning native midwifery practices contributed by Dr W. G. EVANS who alone is in charge of the Medical and Health Administration of the State (see this *Bulletin* 1937 Supp. p. 200\*). In the Report under review Dr Evans again supplies most interesting information relating to these matters and we cannot do better than reproduce what he has to say —

"Native methods of midwifery as practised by the *bidans* (native midwives) in Brunei are not unduly bad if somewhat unorthodox according to Western ideas. A woman in labour lies naked on the floor surrounded by a gaping crowd of relatives, friends and neighbours of both sexes and all ages numbering sometimes three figures. Proceedings have been known to be interrupted by a threat of collapse of the house under the extra weight of spectators, only to be resumed when the house pillars have been reinforced.

An interesting Brunei river village custom is connected with the disposal of the placenta and membranes (the afterbirth). They are first cleaned and washed very carefully, squeezing and wringing until all blood is removed. If the child is a female, a needle thread and piece of cloth, and some betel nut are wrapped in the secundines covered with white cloth and inserted in a straw bag that has been smoked in incense. If male, the articles are some iron nails, some tobacco and betel nut. The straw bag is then placed on a small wooden raft with a lighted candle at each end of the four corners and set floating on an ebb tide."

"The great failing of native methods is in the care of the new-born baby. It is not uncommon for a new baby, awaiting mother's milk to be pinched until it cries and then for the little open mouth to be rammed full of a paste made of rice and bananas well masticated by the attendant. Betel and other irritants are almost invariably applied to baby's abdomen in a compress and it is very rare to find an adult Brunei Malay not bearing scars of such application in his infancy."

The far reaching influences of native customs and practices upon the native health are perhaps rarely realized by some workers in remote places. Their study and description are worthy of greater consideration and it is to be hoped the admirable example shown by Dr Evans may be imitated by others.

*School Hygiene*—During the year 1941 school-children in 17 schools were medically examined, the results of these examinations being set out in an Appendix to the Annual Report. Briefly the findings showed that spleen rates ranged between nil and 40 per cent, the ascariis infection rates from 24 to 92 per cent, and the ancylostome rate from nil to 23 per cent. Other helminths met with were *E. vermicularis*, *Trichuris trichiura*, *Hymenolepis nana*.

*Public Health Sanitation etc*—From the public health point of view the main features characterizing 1936 experience were (a) an all round increase in the volume of medical work and (b) a disappointing increase in the mortality rates. The causative factors responsible for the increase in mortality are at present a matter for conjecture but Dr Evans believes that high mortality in Brunei depends largely on dietary deficiencies. It is pointed out that improvement in the economic condition of these backward peoples increases the incidence of such deficiencies (see this *Bulletin* 1936 Supp. p. 194) and it is

significant to note that 1936 was a more prosperous year than 1935. Dr Evans adds: The penniless peasant of Brunei who lives on home-produced and wild foodstuffs has no beriberi whereas the river-dweller who earns a small salary lives on the verge of avitaminosis.

The general system of public health administration was described in these pages a year ago (see this *Bulletin* 1937 Supp p 200\*) and repetition is unnecessary. As regards *sewage disposal* in the main centres of population bucket latrines are used, sewage being dumped in the tidal rivers. A few houses in Brunei and Kuala Belait have water-borne systems, some discharging into rivers, others to septic tanks. Latrines built on piles over rivers are the usual practice in river villages. Plans are in hand for installing a chlorinating plant at the main water supply to Brunei. A number of hillstreams have been harnessed and the water led out in pipes for the use of river dwellers.

*Hospitals, Dispensaries, etc.*—The three Hospitals maintained by Government continued to function throughout the year (see this *Bulletin* 1937 Supp p 201\*). A travelling dispensary covers the whole State with the exception of the British Malayan Company's area. Though the Brunei Malay is averse from entering hospital for treatment the position in this respect continues to improve as the following records of the year's work prove:—

Hospital	Admissions	Treated	Deaths	Out patients
Brunei	545	571	25	9 196
Tutong	30	30	1	2 737
Temburong	24	25	2	1,506

The British Malayan Petroleum Company continue to maintain their well-equipped hospital at Kuala Belait (see this *Bulletin* 1937 Supp p 201\*). No details of cases treated are supplied.

Summarizing the principal items of morbidity experience during the year it is noted that:—

*Malaria* is kept practically free from the main centres of population but bad spots persist in certain parts of the State: a noteworthy feature is the almost complete absence of malaria in the jungle area drained by the Tutong River though no antimalarial work was carried out in this area. Permanent works effectively disposed of breeding places in the Brunei Town Sanitary Board area. No actual mosquito surveys were undertaken, but larvae collected and identified were of the order described in these pages a year ago. Hospital in patients treated for the disease totalled 125 distributed as to 35 *benign tertian*, 9 *quartan*, 51 *subtertian*, 4 *mixed infections*, 19 *cachectic* and 7 unclassified. Five hospital deaths and 35 deaths in the State as a whole were ascribed to this disease.

At the Laboratory 1 138 blood films were examined for the presence of malaria parasites with positive results in 228 cases. Of the latter 110 were *subtertian* infections, 79 *benign tertian*, 31 were *quartan* and 8 *mixed infections*. Hospital returns show 62 cases of *beriberi* with 4 deaths, one of *avitaminosis*, 3 of *marasmus*, one of *ricketts* and one of *secondary anaemia*. It is stated that practically the whole of the 10 000 people of the Brunei

river village live on the verge of vitamin deficiency. Local custom prescribes the feeding of parturient women and ailing persons on nothing but white rice. Ignorance rather than inability to obtain proper foods appears to be the responsible factor and Dr Evans opines that if it were made much easier for the people to get parily milled rice rather than polished rice the problem might be solved.

*Helminths* met with in the State have been the subject of brief mention under "School Hygiene and Maternity Work" above. It remains to say that in Government Hospitals 28 patients were treated for *ankylostomiasis* and 16 for *ascariasis*; out-patients treated for these infections numbering 31 and 1433 respectively. Among 2,568 stools examined at the Laboratory 865 contained *ascaris*, 209 *trichuris* and 144 *ankylostome* ova.

With regard to venereal diseases it is said that syphilis is practically non-existent but gonorrhoea exceedingly common (see also this Bulletin 1937 Supp. p. 202\*). Hospital in-patients were but 5 of which 4 suffered from gonococcal infections; among out-patients 6 were treated for syphilis and 39 for all forms of gonorrhoea. Only 77 cases of warts were seen among in- and out-patients.

The only two known lepers in the State referred to in the previous issue of this Supplement remain.

*Other diseases* unmentioned in the text of the Report but recorded in Hospital Returns etc. include the following.—*Pulmonary tuberculosis* caused the deaths of 37 people in the State—4 in-patients and 62 out-patients received hospital treatment. For other *respiratory diseases* 18 in-patients and 1,231 out-patients were treated. Only 3 cases of typhoid and paratyphoid appear in the Hospital Returns of in-patients. Five cases of amoebic and 10 of bacillary *dysentery* received in-patient treatment and 3 and 17 respectively were out-patients. 11 deaths were ascribed to dysentery during the year. Among out-patients, 2,040 were treated for *gastro-intestinal ailments*, 6,050 for *affections of the skin* and 1,667 for all forms of *violence*.

*Scientific*—The Laboratory Returns show that 4,972 specimens were received and examined during the year. In addition to examinations and findings mentioned in the preceding notes it remains to say that of 116 specimens of sputa 26 were positive for *Mycobacterium tuberculosis*; among 1,052 urines 491 contained pus casts etc. and 25 out of 98 smears bacteriologically examined were positive for gonococci.

*Financial*—Total expenditure on Medical Department Services amounted to £42,108 a sum which represents 4.5 per cent. of the total revenue or 5.4 per cent. of the total expenditure of the State during the year under review.

## THE STATE OF NORTH BORNEO (1936)

The State of North Borneo occupies with adjacent islands the Northern portion of the Island of Borneo. It lies about 1 000 miles N.W.N. from Singapore and approximately 1 200 miles S. of Hong Kong, has a total area of about 31 000 sq. miles and a coast line of some 900 miles. The territory is under the jurisdiction of the British North Borneo (Chartered) Company; the appointment of the Governor is subject to the approval of the Secretary of State. Headquarters of administration are at Sandakan on the East Coast.

*Introductory Note*—At the request of the authorities of the State of North Borneo and for the first time in the history of these *Tropical Diseases Bulletin Supplements* we are privileged to include a summary of the Annual Report of the Medical Department of the State for the year 1936. On this occasion by reference to earlier reports and other official sources a somewhat more extensive summary than usual has been prepared in the hope that the reader be provided with a reasonably complete picture of the scope, activities and responsibilities of the Medical Department concerned. Where comments upon special features characterizing conditions of health etc. in North Borneo obtained by references made to the contents of earlier Reports are deemed necessary in the course of the present Summary such observations will appear in parentheses.

*Vital Statistics*—The estimated population at the end of the year under review is returned as 290,256. The method applied for the calculation of annual estimates is that involving addition of the excess of births over deaths and immigration over emigration to the estimate obtained in the preceding year. [As regards the reliability of these annual estimates earlier reports refer to the importance for the purpose of intercensal estimates of having correct and complete enumerations of the people at regular intervals, complete and accurate registration of births and deaths and correct immigration and emigration records. The degree of completeness achieved by vital registration in North Borneo is commented upon below. The Census of 1931 said to be as complete as can be expected in the present state of the country's development, enumerated a total of 270,223 persons distributed as to 205,218 natives of Borneo, 47,779 Chinese, the remaining 17,000 odd comprising Europeans, Eurasians, Malays, etc. The tribal classification of natives of Borneo reads *Dusuns* 117,482, *Muruts* 24,444, *Bajans* 34,099, *Bruneis* 21,112, and *Sulus* 8,081. Classification of the population by race or tribal group is not given in the Annual Report under review.]

*Registered births* numbered 8,184 and *deaths* 6,282, the resulting birth and death rates being 23.2 and 21.6 respectively. *Infant deaths* numbered 1,431 giving an infant mortality rate of 176.5 per 1,000 live births. [Of the total births 8,106 were live births.] Births and deaths are classified by race and sex for each District, and deaths in 8 age-groups for each District. Of vital registration in general the Report observes: Registration of births and deaths is compulsory throughout the whole territory, at the same time these statistics should be accepted with reserve. Owing to the fact that a large part of the population of the Interior and West Coast lives in remote villages the registration of births and deaths is necessarily incomplete. [In this

Hospital admissions for *malaria* numbered 630 and hospital deaths due to this cause 28. *malaria* was therefore responsible for approximately 15 per cent of all hospital cases and 11 per cent. of all hospital deaths. The numbers of persons suffering from malaria and treated as out patients at hospitals and dispensaries are not stated. It is noted that among 2,405 blood films received from Government Hospitals and dispensaries and examined at the Laboratory 466 were positive for malaria parasites. Among the positive findings *P. falciparum* infections were responsible for 33.9 per cent. *P. vivax* 53.6 per cent. *P. malariae* 6.9 per cent. and mixed infections 5.6 per cent.

On four occasions during 1936 when on tour Dr J. C. T. TREGARTHEN District Surgeon Interior Residency recorded the following results of his examination of natives —

Number examined	With enlarged spleens	Per cent
( ) 1 014	633	62.4
(b) 6 039	5,563	92.1
(c) 4 125	3 820	92.6
(d) 2 312	2,280	98.6

Six cases of *blackwater fever* with one death were reported.

*Beriberi* was responsible for 164 hospital admissions with 12 deaths. Of the total patients admitted 39 were from Sandakan Town and 28 were Constabulary cases. As regards the former it is pointed out that the majority were labourers from outlying logging camps who gave lodging house addresses in Sandakan on admission. The Constabulary cases were all of mild type. on enquiry it was found that the rice issue was highly polished beriberi-producing rice if eaten without other foodstuffs producing an adequate supply of Vitamin B. A new diet scale was issued and no further cases occurred.

Cases of *dysentery* admitted to Government Hospitals numbered 227 (type of infection not differentiated but we understand this has always been found to be amoebic) and 15 deaths were ascribed to this cause. *Pulmonary tuberculosis* was the cause of 82 hospital admissions with 26 deaths and *pneumonia* 77 cases and 30 deaths. At the laboratory 78 out of 499 specimens of sputum examined gave positive results for *Mycobacterium tuberculosis*.

During the year 12,247 vaccinations against *smallpox* were performed with successful results in 80.5 per cent. of the cases. No case of any dangerous infectious disease was reported in the State during 1936.

*Helminthiasis* — The campaign against *ankylostomiasis* inaugurated in 1921 by the Rockefeller Institute continues under the supervision of Dr C. H. YEAGER and a special staff. All Government servants, school-children and certain classes of employed estate labourers are examined twice yearly for hookworm infection and, if necessary given treatment. In Sandakan and Jesselton where 8,298 persons were examined the infection rate was 5.7 per cent. in other areas total treatments numbered 18,508. The Laboratory Report tabulates the findings among 3 684 faecal specimens examined. Among the positive

findings ancylostome ova alone were present in 231 cases ancylostome with ova of other parasites 238 ascaris alone 564 ascaris with other helminths 315 *E. histolytica* alone 303 and with other intestinal parasites 21

*Leprosy*.—During the year there were 8 admissions to the *Leper Settlement* 6 patients died 2 absconded and one was discharged. Seven of eight admissions were Chinese, the eighth a male Dusun. At the end of the year 69 patients remained in the Settlement. Treatment is by weekly intramuscular injections of hydnocarpus oil with creosote. At the Laboratory among 22 nasal smears 8 were positive and 14 smears from nodules gave 4 positive with *Mycob. leprae*.

The *Venereal Diseases Clinic* established in Sandakan in 1927 continues to function with success. *Syphilis* is said to be uncommon but *gonorrhoea* is extremely prevalent especially in some interior districts. During the year 22 new cases and 79 repeat cases were treated for syphilis and 37 new cases and 119 repetitions for gonococcal infections. Urethral and vaginal smears examined at the laboratory numbered 1 675 and 195 respectively 990 of the former and 59 of the latter being positive with the gonococcus. On three occasions when travelling in the interior Dr Tregarthen found that 837 out of 1,254 smears examined gave positive results i.e. an infection rate of 66.7 per cent. the rates ranging in the three areas from 57.4 to 77.4 per cent. Of the 7 162 cases of *yaws* treated during the year 6 687 are recorded as new cases.

*Scientific*.—The Laboratory Report contains an unusual amount of detail relating to the year's work. Under such headings as *malaria* *helminths* *leprosy* etc. in the preceding notes brief mention has been made of the specimens received and examined and the principal findings recorded.

During the year under review an investigation into the native health was in progress under the direction of Dr J. O. SHIRCORE the terms of reference being —

(1) Generally to study the sociological and economic conditions under which the people live, and all matters relating to the health *morbidity and mortality* of the population with special reference to mother and child.

(2) To submit a report making at the same time recommendations calculated to promote the well being of the Native and counteract the influence of any dysgenic at play.

A report of the results of this enquiry will be available in due course.

*Financial*.—Total expenditure on Medical Department Services during 1936 amounted to \$161 487 as compared with \$161 068 in the preceding year.

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## HONG KONG (1936).

Hong Kong is one of a number of islands off the south-east coast of China, at the mouth of the Canton River about 91 miles south of Canton and 40 east of Macao. Hong Kong is 11 miles long and from 2 to 5 miles wide and has an area of about 32 sq miles. It is separated from the mainland of China by the LYCERNON PASS. The peninsula of Kowloon on the mainland, area 2½ sq miles, forms part of the Colony together with the adjacent New Territory. The whole Colony has an area of about 345 sq miles.

*Introductory* — For the greater part, the text of this Report remains unchanged and in these circumstances the summary which follows will be confined to noting new developments or changes of importance and the recorded numerical assessments of health experience in the Colony during the year under review (see this *Bulletin* 1937 Supp., p. 203\*) For further descriptions of Public Health work the reader is referred to previous issues of this *Supplement*

The *Vital Statistics* can be classified as follows —

*Estimated Populations*

	The Urban area of Victoria	The Village of Hong Kong	The Urban Area of Kowloon	The New Territories	Junks and Sampans	Totals
Non-Chinese	10 305	477	11 025	25	—	21,832
Chinese	352 119	50 605	327,858	105 778	100 000	836,358
Totals	362,424	51,082	338,883	105 801	100 000	858 190

*Natality and Mortality Rate*

Item	Births	Birth Rate	Deaths	Death Rate	Infant Mortality	I M R.
Non-Chinese	550	24.3	236	10.8	19	33.8*
Chinese	26,853	27.8	26 120	27.0	9,905	366.9*
Totals	27,353	27.7	26,356	28.7	9,924	362.4

[ It is regretted that by some mischance in the last issue of this Supplement, the infant mortality rates for these two population groups were interchanged, making the Chinese rate read 36.9 instead of 316.4 ]

*Europeans and Americans* resident in the Colony were estimated to number 9 638 (and of these 7 446 were British) deaths 138, and the death rate 14.3 per 1,000. *European Officials* resident numbered 969 with an average number resident of 886 ten were invalided and seven died.

*Maternity and Child Welfare Work* — No change in the maternity hospital accommodation available. At the four Government Hospitals 3,848 maternity cases were dealt with and 26 maternal deaths recorded, the corresponding figures for cases treated in Chinese hospitals being 7,417 and 28 respectively. Admissions to the Obstetrical and Gynaecological Unit (University Cases) at the Government Civil Hospital numbered 742, deliveries 705 and maternal deaths 3

*Midwives*—Seventy-four candidates satisfied the examiners at the Midwives Board Examinations there are now 404 names on the Midwives Register. The 15 Government Midwives attended 2,212 maternity cases during the year.

*Ante-natal and Infant Welfare Work* continued to be carried out as previously described attendances at centres exceeded previous records. At the Gynaecological Clinics 6,207 new and 10,674 old cases were dealt with.

A new feature in the Report deals with the results of the investigation into *infant feeding* samples of European and Chinese breast milk, various brands of sweetened condensed milk, and of dried milks were collected and analysed results showed a close similarity between the milk of European and Chinese women and a serious deficiency in the fat content of condensed milk as compared with breast milk. The results of feeding investigations showed that children fed on condensed milk appeared to show small gains in weight with a high percentage of illness and that dried milks proved satisfactory feeds for infants. No definite conclusions can be reached on the basis of available information however.

*School Hygiene*—Physical examination of pupils was confined to 17 Government schools having 4,988 pupils. Dental defects showed a high incidence rate, and postural deformities of chest and spine are said to be common among entrants to Government schools. Treatment attendances at the five clinics totalled 3,800. The need for health measures is said to be more urgent among the primary vernacular schools which were more or less untouched these schools have 59,977 pupils on the registers.

*Public Health Sanitation etc*—Under the Urban Council Ordinance and various Public Health Ordinances which came into force at the beginning of the year the Medical Department and the Sanitary Department were brought into closer relationship. The Director of Medical Services became Vice-Chairman of the Urban Council (which replaced the old Sanitary Board) and assumed the direction of the activities of the Urban Health Officers and Sanitary Inspectors. (For comparison with former organization see this *Bulletin* 1935 Supp p 191\* 1936 Supp p 197\* and 1937 Supp p 205\*)

*Port Health Work*—The only changes under this heading have reference to the *Sanitary Control of Aerial Navigation* the local laws regarding which are contained in the *Quarantine and Prevention of Diseases Ordinance No 7 of 1936*. Kai Tak Civil Airport has been declared an "Authorised Aerodrome" and all necessary arrangements made for the provision of services in connexion therewith. The following data summarize the principal items of work concerned with ocean-going ships etc. —

*Vessels entering and clearing —*

British ocean-going steamers	..	...	..	..	4,618
Foreign ocean-going steamers	..	...	..	..	6,384
Other vessels	..	...	..	..	29,648
Total tonnage dealt with	...	...	...	..	40,043,043
Ships examined	..	...	...	...	350
Emigrants examined	..	...	..	..	164,077
Emigrants rejected	..	..	..	..	1,298

Principal causes of rejection: *fever* 392, *trachoma* 741 *skin diseases* 80.

*Hospitals Dispensaries etc*—The Queen Mary Hospital approaches completion and should be ready for occupation in 1937. The record of work at Government Institutions (exclusive of maternity cases among in patients and V D cases among out patients) during 1936 may be summarized as follows —

Hospital	Beds	In-patients	Hospital Deaths	Out patient Attendances (ex V.D cases)
Government Civil	225	5 675	409	103,266
Victoria General	46	579	—	—
Hongkong	97	3,367	300	62,507
Infectious Diseases	26	8	—	—
Mental	32	419	21	—

At the Victoria General Hospital 96 per cent of the in patients were Europeans but at all other hospitals the great majority were Chinese. At the *Chinese Hospitals* (again exclusive of maternity cases) the record reads —

Hospital	Beds	In-patients	Deaths	Out patients
Tung Wah	470	14,974	2,336	186,563
Awong Wah	299	13 591	4,828	230,919
Tung Wah Eastern	222	7 623	1,935	99 416
Tung Wah Infectious	See this <i>B. Hk.</i> 1936 Supp p. 199* Since Ma 1935 used temporarily as a refuge for lepers. During the year 129 lepers admitted, 12 died, 7 discharged, 21 absconded			

At the *Government Dispensaries* (6 Rural, 1 Travelling) patients treated included 22,486 new and 24,885 old cases, the corresponding figures for the nine *Chinese Dispensaries* being 252,444 and 222,383 respectively.

The only sources of information available for gauging the state of the public health in the Colony are the records maintained by Government and Chinese Hospitals, and the notifications of infectious diseases. So far as the Report under review is concerned it is noted that though *malaria* *plague* *smallpox* *cerebrospinal fever* *diphtheria* *enteric fever* *pulmonary tuberculosis* *leprosy* *rabies* and *dysentery* are commented upon, with the exception of *dysentery* and *malaria* the observations are repetitions of the remarks recorded in the Annual Report for 1935 (see this *Bulletin* 1937 Supp pp 207\*-209\*).

With regard to *malaria* the classified returns show that to Government Hospitals 581 patients were admitted, 592 treated and 21 died. The distribution of types of infection among the 592 in-patients gives 274 *subtertian*, 181 *benign tertian*, 7 *quartan*, 136 *cachexia* and 24 undefined. At Chinese Hospitals admissions numbered 1,341 total treated 1,358 and *malaria* deaths 242. Among the Chinese cases 833 were *subtertian*, 209 *benign tertian*, 1 *quartan*, 20 *cachexia*, and 195 were undefined. It is said that as a result of the extensive investigations conducted by the Malarialogist and his staff, the Colony

now possesses all the knowledge necessary to combat malaria successfully. It is further noted that *A. hyrcanus* the principal carrier in Shanghai is of little importance in Hong Kong where its rate of infection under natural conditions is low and where it has a preference for animal blood meals.

At the Government Bacteriological Institute 8481 blood films were examined for the presence of malaria parasites and of these 4092 gave positive findings with subtertian infections 52.4 per cent, benign tertian 41.0 per cent, and quartan 6.5 per cent. The distribution of percentages of types of infection by months shows some interesting variations, as may be gathered from the following data —

Month	Subtertian	Benign tertian	Quartan
March	9.9	36.6	53.5
June	25.8	61.7	12.5
September	58.1	40.1	3.8
December	57.3	39.0	3.8

The comprehensive *Annual Report of the Malaria Bureau* occupies upwards of 30 pages of the Report under review and describes in great detail the extensive surveys and research work undertaken during the year (see this *Bulletin* 1936 Supp. p. 200\* and 1937 Supp. p. 207\*-208\*). A considerable amount of new work was concerned with investigating the prevalence of malaria in certain areas in the Colony. A full report of the results of precipitin tests made by Dr. TOUMAKOFF of the Pasteur Institute Saigon on material submitted by the Bureau are given and have also been separately dealt with in his paper *L'Anophelisme en l'Extrême Orient*.

Dysentery is discussed at some length by virtue of the occurrence of a serious outbreak in November. In the first place 12 European children became infected and 7 died, and within the next 11 days a further 35 cases were recorded, all but 4 of whom were European children under 10 years of age. In 25 cases the causative organism was proved to be *Bact. dysenteriae* Shiga, and in 4 *Bact. dysenteriae* Flexner; in the remainder the organism was not identified but Shiga infection was strongly suspected. There being some indication that the infection was milk borne and that the majority of the cases had consumed milk from the same source of supply, investigations followed but failed to bring to light any source of contamination.

Dysentery cases treated as in-patients at Government and Chinese Hospitals were —

	Government Hospitals		Chinese Hospitals	
	Cases	Deaths	Cases	Deaths
Amoebic	4	—	221	60
Bacillary	164	17	140	54
Undefined	24	—	56	11
Totals	192	17	417	125

At the *Bacteriological Laboratory* among 824 faecal specimens examined 465 were *Bact. dysenteriae* (Group) 116 Flexner 31 Shiga and 14 Schmitz infections. Some work was done on a group of insignificant strains of *Bact. dysenteriae* Flexner in an effort to identify them with strains isolated in India of which the antigenic pattern has been definitely established. None of the local strains was agglutinated by any of the anti-sera of the Indian organism.

Cases of other infectious diseases dealt with during the year included the following —

Disease	Government Hospitals		Chinese Hospitals		The Colony	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Smallpox	7	—	4	—	23	18
Cerebrospinal Fever	16	8	113	—	123	65
Diphtheria	79	34	216	41	375	214
Enteric Fever	87	20	170	60	418	136
Pulmonary Tuberculosis	214	54	2,840	1,554	?	2,418

It has already been said that textual comments relating to the above diseases remain for all practical purposes as presented in the 1935 Report. In connexion with smallpox it is necessary to add that the vaccination campaign was continued and 274 784 persons were vaccinated. At the *Bacteriological Laboratory* 281 cerebrospinal fluids were cultured 74 of these showing the presence of the meningococcus 2,058 throat swabs were examined and 407 were positive for *C. diphtheriae* 1 445 sera were examined and of these 361 agglutinated positively with *Bact. typhosum* 13 with *Bact. paratyphosum A* and 5 *Bact. paratyphosum B*. Out of 785 specimens of sputa examined 183 were positive for *Mycob. tuberculosis*.

Other diseases referred to in the Report and calling for mention include beriberi which caused the deaths of 745 people Government Hospitals treated 45 cases of the disease (8 deaths) and Chinese Hospitals 1,255 with 257 deaths. Then the respiratory group of diseases provides serious causes of sickness and mortality. Within this group broncho-pneumonia kills more people than any other disease during the year no less than 4 463 deaths were ascribed to this cause in Government Hospitals 167 patients were treated, 116 died, and in Chinese Hospitals 2 037 cases with 1 451 deaths were recorded. Bronchitis caused the deaths of 2,712 persons in the Colony 206 cases were treated in Government Hospitals (4 deaths) and 3,967 cases in Chinese Hospitals with 1 175 deaths. Pneumonia was responsible for 831 deaths in the Colony of the total 260 died in various hospitals where 668 cases were treated—61 in Government and 607 in Chinese Hospitals.

The commentary on leprosy remains unchanged (see this *Bulletin* 1937 Supp. p. 209\*) and mention has been made of the use of the Tung Wah Infectious Diseases Hospital as a temporary refuge for lepers (q.v. *Chinese Hospitals supra*).

*Veneral diseases*—The facilities available for treatment remain as previously described and except for slight changes involving times of treatment at various centres the descriptive text in the Report is a repetition. It remains to present details of the year's work etc. —

Clinic	New Cases		Total Attendances	
	M.	F.	M.	F.
Government Civil Hospital	1 913	666	8 677	2 865
Violet Peel Health Centre	775	611	4 469	3,258
South Island	1 432	439	7 675	2,159
Howloon Hospital	272	576	1 478	2 211
Taipei Dispensary	16	12	374	54
Un Long Dispensary	54	3	397	13
Totals	4 462	2,307	23 060	10 560

Approximately 91 per cent. of the total new cases and 81 per cent. of total attendances were Chinese. In patient cases of *syphilis* treated at Government and Chinese Hospitals numbered 395 *gonococcal infections* 269 and *soft chancre* 99. At the Bacteriological Laboratory Wassermann tests were applied to 16,841 blood samples. 5 786 gave positive reactions 1 158 doubtful and 9 697 negative results.

In patients treated in the *University Teaching Medical Wards* (University Clinical Units) numbered 440 and 49 deaths were recorded while out patients (new and old cases) totalled 8 749. For the treatment of *cerebrospinal meningitis* Ferry's antitoxin used by the intra-venous and intra-muscular routes produced good results among a small number of cases. The Professor of Surgery reports that 485 in patients were dealt with in addition to 2,993 out patients in the Surgical 1,269 in the Ear Nose and Throat and 3 177 in the Ophthalmic Clinics.

*Scientific*—The volume of work at the Government Bacteriological Institute continues to increase and during the year 39 134 examinations were carried out an increase of over 40 per cent. on the 1935 records. Growth has been so steadily continuous that facilities are becoming inadequate. Mention has already been made in previous sections of this summary to the principal samples examined and findings recorded, and brief reference has also been made to the dysentery research work. It remains to add that during the latter part of the year there began an investigation of the titre of agglutinins against *Bact. typhosum* in the average hospital population in the Colony as measured by the serological reaction of the "O" and "H" antigens in use for the Widal test performed at the Institute. This study continues.

The Government Analyst also reports a record year as regards the volume of work dealt with. 4,339 samples were received examined, and reported upon and of these 3 454 were samples from official sources 131 semi-official and 754 unofficial. Owing to shortage of staff no new investigation could be initiated.

*Financial*—Total expenditure on Medical Services amounted to \$5,860,689 a sum which represents 19.8 per cent. of the total revenue of the Colony during 1936.

# PACIFIC OCEAN

## Fiji and Western Pacific (1936)

The Colony of Fiji comprises some 200 to 250 islands of volcanic origin in the south Pacific Ocean (many merely uninhabited islets and rocks) lying between 15° and 22°S latitude and longitudes 177°W and 175°E. Sydney is about 1 700 miles distant and Auckland 1 100 miles. The Tongan or Friendly Islands lie 180 miles to the south east and Samoa 600 miles to the north-east. The principal inhabited islands are Viti-levu with an area of 4 053 sq miles, Vanna-levu 2,130 sq miles, Taveuni 217, Kadavu 124, Koro 58, Gau 45, Ovalau 43, Rotumah 14 sq miles. The total area of the Colony is 7 083 sq miles (nearly that of Wales).

*Vital Statistics*—The principal vital statistical facts for the year under review are as follows—

Race	Popula- tion	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I M.R.
Europeans	4 169	64	15.4	33	7.9	2	31.3
Half Castes	4 646	160	34.4	52	11.2	10	62.5
Fijians	96 291	3 715	37.8	2,755	28.0	522	140.5
Rotumans	2 844	109	38.3	67	23.6	16	146.8
East Indians	86 778	3 454	40.2	1 069	12.3	283	81.2
Polynesians	1 462	76	17.8	45	30.8	2	76.9
Chinese	1 792	20	11.2	15	8.4	?	?
Others	1 114	55	50.3	20	18.0	3	53.6
Totals	201 066	7 634	38.0	4 056	20.2	836	106.8

The higher *general death rate* was due chiefly to dysentery, enteric fever and pneumonia and the increased *infant mortality* to epidemics of mumps, measles, whooping cough and dysentery. These causes are commented upon below.

*European Officials* resident numbered 361 and an average number resident of 336. Twelve invalidings and one death were recorded. *Native Officials* resident numbered 569 and the average number resident 529. Two invalidings and two deaths occurred within this group.

*Maternity and Child Welfare Work*—The Obstetric Ward of the Colonial War Memorial Hospital reports a busy and successful year. 230 births are recorded—an appreciable increase in attendances at the ante-natal clinic is noted. During the year patients numbered 63 and attendances 168 (see this *Bulletin* 1937 Supp. p. 211\*). The usual training of native Obstetric Nurses was continued with 20 pupils taking the course.

Child welfare work progresses steadily and working Committees are now established in practically every village. Employed in this work are four trained European and 14 Native Nurses while District Medical Officers and Native Medical Practitioners co-operate with all those engaged. It is stated that at Child Welfare Centres special attention is devoted to the treatment of scabies and other skin conditions formerly so prevalent among children in Fiji.

*School Hygiene*—Medical inspection of the children attending the three schools previously described (see this *Bulletin* 1937 Supp. p. 211\*) was carried out as usual during the year. The following notes briefly summarize the principal findings during the course of these inspections.

*Girls Grammar School*—Out of 188 pupils examined 102 had carious teeth and 94 enlarged tonsils in several cases accompanied by enlarged cervical glands. Throat swabs taken at random revealed one positive for diphtheria and several yielded growths of the non haemolytic streptococcus, staphylococcus aureus and streptococcus viridans. At the *Boys Grammar School* where 103 pupils were examined 39 had carious teeth, 38 enlarged tonsils, 17 cases showing enlarged cervical glands. Throat swabs revealed no diphtheritic condition. At *Queen Victoria School* 56 pupils were examined, 22 had carious teeth, inoculation against typhoid was carried out and stools were examined. At the *Boys Grammar School* and *Queen Victoria School* epidemics of mumps occurred. The question of diet for European and other children in Fiji is to be investigated.

*Public Health Sanitation etc*—From the public health point of view the year was not a good one, the death rate being the highest for some years past. During 1936 new Public Health Regulations were drafted with the object of condensing and simplifying the numerous existing Bye-Laws and Regulations. It is hoped these new Regulations will receive the approval of Government and soon become law. The new sanitary code if energetically applied should ensure considerable improvement in existing sanitary conditions. In view of the importance and recent development of the gold mining industry, and the necessity to safeguard the health of those engaged in the Fiji mines, silicosis was added to the list of compulsorily notifiable diseases during the year.

As regards general hygiene and sanitation in the Colony, the Report confines attention to activities in the Suva Rural Sanitary District. As regards sewage disposal in that area it is noted that the 2,445 recorded buildings (of which 2,350 are private dwellings), 2,064 are served by cement slab latrines and 218 by septic tanks, only 9 are unprovided with adequate sanitary conveniences. The Suva *Garbage Disposal Bye Laws 1936* effectively control the disposal of refuse etc. in the Urban Sanitary District. Of the 2,445 buildings in the rural district 878 have piped water supplies, 420 have tank supplies, 215 depend on river water, 766 are served by protected and 166 by unprotected wells. It is proposed to install a chlorinated and filtered pipe-borne water supply system throughout the Suva Rewa area.

Systematic house-to-house inspections and re-inspections continued to be made by the sanitary staff throughout the year and various sanitary improvements insisted upon. Fiji continues to be a non-malarial country and the authorities take the most stringent precautions to prevent the introduction of anopheline mosquitoes.

The *Town Planning and Building Regulations* are gradually improving the appearance of the business area. Dwelling houses must be erected in accordance with the requirements of the Building Bye-Laws. A complete survey of Suva is to be carried out so that a comprehensive town planning scheme might be formulated.



*Port Health Work.*—The usual routine duties continued to be carried out as previously described (see this *Bulletin* 1937 Supp. p. 212\*). During the year 147 incoming vessels were boarded and 3 785 passengers and 2,662 members of crews were medically inspected. In December all the 578 Indian immigrants arriving from Calcutta were placed in quarantine—no sickness occurred and quarantine was lifted after four days. Of the 2,621 rats trapped in the port area, 1,978 were *R. norvegicus* and 645 *R. rattus*. 564 carcasses were examined at the Laboratory where all were negative for *P. pestis*.

*Hospitals, Dispensaries, etc.*—Among other items of interest in this section of the Report it is noted that provision of £20 000 is to be made for the erection of new hospital buildings. Other schemes envisage the reorganization of the Staffs of European and Native Nurses and the possibility of establishing a School of Public Health providing facilities for the training of Native Medical Practitioners, Native Nurses and Fijian and Indian Sanitary Inspectors. With the exception of Lautoka Hospital the work at all other hospitals continues to increase—the relevant facts read as follows—

Hospital	In-patients	Deaths	Out patients
Colonial War Memorial	2 074	228	17,300
Lautoka	2,053	116	8 797
Levuka	304	30	4,066
Lamam	763	36	8,353
Provincial and Plantation Hospitals, etc.	3,849	344	54,048

Native Medical Practitioners in charge of dispensaries treated 42 171 cases and recorded among their patients 293 deaths.

According to Appendix B of the Report there are 56 hospitals and dispensaries in the Colony. It is by no means easy from the printed list to differentiate between hospitals and dispensaries, but there would appear to be 16 of the former exclusive of Mission Hospitals, etc. In the text of the Report references to diseases treated during the year include the following—

Reported cases of *enteric fever* numbered 188. Of these 38 occurred in Rewa District, 92 in Mbe and Tavua and 27 in Suva Rural Sanitary District, all these areas being on the main island of Viti Levu. The provision of an adequate and purified water supply would lead to a substantial decrease in the incidence of the disease (see comments under *Public Health* above). Of the total cases recorded 80 received treatment in the Colonial War Memorial Hospital with 11 deaths and 131 in other hospitals with 17 deaths. At the Laboratory 32 out of 240 specimens examined were positive for *Bact. typhosum*.

*Dysentery* chiefly of the Shiga variety was again prevalent with a considerably increased incidence and mortality. Altogether 1 745 cases with 148 deaths were reported, 400 cases in the first, 492 in the second, 337 in the third, and 516 in the fourth quarters of the year respectively. The north-western area of the main island of Viti Levu was principally affected, and from the Rewa district alone 367 cases were reported. It is believed the prevalence of the disease is less due to defective soil sanitation than to polluted water supplies and that the provision of piped supplies should eliminate these seasonal

epidemics of bacillary dysentery. Among 772 faecal specimens examined at the Bacteriological Laboratory 64 were positive for *Shiga* & bacillus 40 for Flexner 23 Schmitz 8 Sonne and the protozoon *E. histolytica* was found in 6.

Clinically *diphtheria* is said to be a rare disease in Fiji. During the year 21 cases were reported and from these the Klebs-Loeffler bacillus in more or less pure culture was isolated. Of *smallpox* no cases appear to have occurred but 3,500 persons were vaccinated against the disease. Under the heading *Scientific* below reference is made to a report on the results of vaccination with dried calf lymph. An epidemic of *influenza* swept through the Colony during the year and gave rise to 1,358 cases on the whole the disease was of a mild type. *Measles* in epidemic form was present throughout the Group and 3,328 cases were notified with a practically *nil* mortality. It is interesting to note that since the tragic epidemic of 1875 the Fijians appear to have acquired a certain immunity against the disease.

Five cases of *epidemic dropsy* were reported four of these from the Suva Gaol though it is stated none of the gaol cases were definitely proved to have been due to dietetic deficiency.

*Tuberculosis* (all forms) was responsible for 280 cases with 59 deaths and of the total cases recorded 225 were due to the *pulmonary* type of the disease, while of these pulmonary cases 138 occurred among Fijians. Dr LAMBERT local Director of the Rockefeller Foundation proposes making a tuberculosis survey of the Colony. There were 409 cases of *pneumonia* with 139 deaths this serious increase in incidence and mortality being attributed to the epidemics of *measles* and *influenza* during the year.

*Ankylostomiasis* (see this *Bulletin* 1937 Supp. p 214\*) is a notifiable disease during the year 371 cases were notified and 6,351 persons were treated with carbon tetrachloride and tetrachlorethylene. The *Megarhinus splendens* imported in 1932 and bred through several generations by the Health Department have been liberated throughout the Colony. It is hoped these mosquitoes will have a marked effect in reducing the numbers of *Aedes variegatus* the usual intermediary of *filaria*.

In the list of infectious diseases notified 352 cases of *venereal diseases* are quoted 277 of these occurring among Indians. At the Colonial War Memorial Hospital 6 patients were treated for *syphilis* and 22 for gonococcal infections and at other hospitals 20 for *syphilis* and 97 for gonococcal infections. Notified cases of *yaws* numbered 3 198 and 7,500 injections of N.A.B. were given during the year.

*Leprosy*—The Government Leper Station on the island of Makongai completed its jubilee anniversary during the year under review. Dr C. J. AUSTIN Medical Superintendent of the Leper Hospital once again contributes a comprehensive and interesting account of the work the first part of his Report being devoted to a short historical account of the development of the institution from the time of its inauguration in 1911. Since that year over 2 000 patients have been admitted.

At the beginning of the year under review there were 575 patients on the books 60 new patients were admitted during the year (these included 37 Indians and 15 Fijians) 54 died 20 were conditionally discharged and 6 were repatriated leaving 555 patients resident at the end of the year. It is noted that 44.2 per cent. of the Fijians were

neural cases as compared with 32.2 per cent. among Indians and that 20.3 per cent. of the Fijians were advanced cutaneous cases while only 3.1 per cent. of the Indians reached that stage. This Report discusses at length such matters as treatment and results of treatment, race and type of leprosy related to progress, sex influences on incidence and prognosis and other items of interest to leprologists.

Other *Special Reports* featuring the Annual Report under review include the following —

(a) The Report of Dr T CLUNIE who describes the work at the Colonial War Memorial Hospital. Dr F WIDLAKI deals with the activities of the X-ray Department at the same institution.

(b) Dr B W HOODLESS contributes an account of the year's work at the Central Medical School, Suva, where 40 medical students were in residence and three qualified Native Medical Practitioners attended post-graduate courses. At the usual final examinations held in 1936 ten out of eleven candidates were successful.

*Scientific*—The work of the Pathological and Bacteriological Laboratory is dealt with by Dr C M MACPHERSON. The outstanding event of the year was the completion and occupation of the fine new modern Pathological, Bacteriological and Biochemical Laboratories in which research work and scientific investigation can be satisfactorily carried out. Funds to assist in the erection and equipment of these laboratories were most generously contributed by the Rockefeller Foundation. A full description of the premises and equipment together with photographs of the exterior and of interior units is contained in the Report by Dr Macpherson.

With regard to Laboratory work during the year of the 6124 specimens received and examined, 1,531 were stool specimens examined for the presence of helminths, and of these 23.7 per cent. were positive for *hookworms*, 6.5 per cent. *trichuris*, 5.6 per cent. *ascaris* and 2.8 per cent. *oxyuris*. Kahn tests numbered 373 and throat swabs for K.L.B. 562.

Dr C H B THOMPSON, Medical Officer of Health, contributes a paper entitled "*Results of Vaccination with the Dried Calf Lymph supplied by the Pasteur Institute, Java*". A total of 350 vaccinations was performed with the available lymph with 92.5 positive reactions. In view of these encouraging results it is recommended that the solid lymph be given an extended trial in Fiji and if the so far favourable results are confirmed the new form of lymph be used in preference to that normally used as being more efficient and economical.

*Financial*—Of the total revenue of the Colony £81,085 or 8.4 per cent. was expended on Medical Services during 1936.

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### British Solomon Islands Protectorate (1938)

The British Solomon Islands Protectorate is situated between the parallels of 5°S and 12°30'S and the meridians of 155° and 170° of E. longitude. It consists of Guadalcanal, Malaita, San Cristoval, New Georgia, Yasabel and other islands east of New Guinea with a total area of about 11 458 sq. miles.

*Vital Statistics*—The population of the Protectorate in round numbers is said to be Europeans 500 Asiatics 200 Natives 94 000 i.e. a total of 94 700 persons. Records of births and deaths are not complete and data are supplied for four districts only, but as the populations of each of these are not supplied it is not possible to calculate birth and death rates. On the Island of Guadalcanal (one of the four districts mentioned above) births and deaths are said to have been recorded with care since 1928 during the year under review deaths exceeded births by 11 in this area a development due to a severe epidemic of influenza (see below). No vital facts are available from the remaining four administrative areas the latter including the Island of Malaita which from the standpoint of population and commerce is the most important island in the Group. The District Officer Malaita supplied some interesting and suggestive facts: he observes that natives having families of four or more children are exempt from payment of the five-shilling head tax that in the five sub-districts of Malaita there has been a steady increase in the numbers of such families that in the year under review heads of families entitled to the exemption numbered 1 126 and the estimated population of these areas was 38,900. The population of Guadalcanal is also stated to be increasing and it is believed that the improvement on both Islands is due in large measure to increased fertility resulting from improved health conditions effected by mass treatment for yaws and hookworm.

With regard to non natives it is said that birth and death records are neither of interest nor value many European women leave the Protectorate to be delivered of their babies and persons who become chronically ill also leave the territory.

*European Officials* resident numbered 35 with an average number resident of 28. No invalidings or deaths were recorded.

The population of indentured labourers is returned as 3 457 and within this group 44 deaths were recorded influenza and beriberi were responsible for greatly increased mortality.

*Public Health Sanitation etc*—Health conditions during the year under review compared unfavourably with the experience of previous years owing to a widespread epidemic of influenza which continued throughout the year. It is noted that a new medical station under the charge of a Native Medical Practitioner was established on Yasabel Islands and that legislation amending the Solomons Public Health Regulation of 1918 was enacted during the year though in what respect is not stated.

No alteration in methods of *sewage disposal* is reported. The pan latrines in general use are emptied nightly by prison labour several residences the hospital and the Tulagi Club have septic tank installations with discharge into the sea. *Refuse* is disposed of by incineration or by dumping into the sea. Non natives and natives on Tulagi (Headquarters of the Resident Commissioner) at District Stations and

on plantations are dependent upon rain water stored in tanks for their water supplies while villagers have recourse to streams and rivers.

With regard to food supplies it is noted that non-natives obtain from Australia adequate supplies of fresh meat and vegetables to augment foodstuffs produced locally. Indentured labourers are fed largely on imported foods but their use is not customary among the general native population.

The routine inspection of houses etc. and other works previously described, continued to be carried out (see this *Bulletin* 1937 Supp., p. 216\*).

*Training of Medical and Sanitary Personnel*—Four students continued their studies at the Central Medical School Suva another graduated as a Native Medical Practitioner and an additional candidate was receiving preliminary training prior to entering the Central Medical School, Suva. Three natives were trained as village dressers at the Tulagi Hospital.

*Port Health Work*—No case of quarantinable disease was reported at any of the three ports of entry. During the year 53 ships entered these ports.

*Hospitals Dispensaries etc.*—In addition to the institutions described in these pages a year ago (see this *Bulletin* 1937 Supp. p. 217) the Report under review contains data relating to two additional native Hospitals, viz. Tabata Hospital on Isabel Island and Aola Hospital on Guadalcanal Island. The record of work at four Hospitals reads as follows—

Hospital	In-patients	Deaths	Out patients
Tulagi			
Europeans	41	1	Averaged approximately 15 daily
Asiaties	23	0	
Natives	698	23	
Tulagi Genl. natives only	51	0	?
Aok			
Natives only	239	1	3,451
Tabata			
Natives only	131	2	425
Aola			
Natives only	41	0	451

Drugs and dressings are supplied to a number of *Mission Hospitals* by the Medical Department while Government subsidizes the Fanaba Hospital of the Melanesian Mission to the extent of £200 per annum. The work carried out at these non-Government centres is said to be excellent but no records are supplied.

*Malaria* is described as being "universally present throughout the Protectorate." No unusual manifestations of the disease were noted during the year. At the Tulagi Hospital 38 cases were treated as in-patients with one death. Types of infection were not differentiated. The policy of distributing quinine through the agency of Government Officers and Missions was continued (see this *Bulletin* 1937 Supp., p. 217\*). One non-fatal case of *blackwater fever* was recorded.

*Influenza* which made its appearance in May was the outstanding public health experience during the year. Though definite proof is lacking it is thought the infection was imported from Australia. The

disease spread throughout the Group in successive waves and persons affected by the first wave were liable to attack on its reappearance. Other than the 78 cases recorded in the Tulagi Hospital Returns no statement of incidence is supplied, but the Report adds that complications were common and a serious mortality resulted. On the Islands of Gizo and Isabel for unexplained reasons the epidemic produced insignificant effects yet serious results were experienced on Guadalcanal Malaita Nggela and Savo. The District Officer Malaita observes "Deaths were reported from all over the North and that more old people and young people have died rather than people in the prime of life." A report by the District Officer Guadalcanal, states

Deaths exceeded births by 11. The birth rate remained normal but the death rate was greatly swollen by an epidemic of influenza.

In all it accounted directly for 120 deaths adults suffering most whereas the figures for children and infants scarcely varied from those of 1935. [The different experiences on Malaita and Guadalcanal are noteworthy. On Guadalcanal where 436 deaths were registered 314 were adult deaths. No figures available for Malaita—see *Vital Statistics* above.] *Influenza* with its complications was responsible for at least 16 (probably more) of the 44 deaths recorded among plantation labourers.

No case of *typhoid fever* has been seen or reported anywhere in the Group at any time (water supplies see above are said to be almost entirely free from pollution of a serious character). *Bacillary dysentery* which occurs both sporadically and in epidemics is believed to spread by direct contact and by flies rather than by water. Fifteen cases were treated in the Tulagi Hospital with one death.

*Tuberculosis* constitutes a serious health problem. The infection is described as widespread and prevalent but no figures are supplied other than those contained in the Tulagi Hospital Returns where it is noted that out of 29 patients treated 13 were suffering from the *pulmonary* form of the disease and 6 died. Other *respiratory affections* treated at the same institution included 17 cases of *pneumonia* with 4 deaths 4 of *bronchitis* and 3 of *bronchial asthma*.

An outbreak of *beriberi* occurred among the labourers of a timber company the number of cases is not stated but it is noted that nine deaths were ascribed to the cause. Following investigation of the outbreak comprehensive recommendations were made for improving conditions and the repetition of this experience is not anticipated.

*Leprosy*—A survey made on Isabel Island resulted in the discovery of 27 lepers (as compared with 2 recorded in 1935) making a total of 351 known lepers in the Group. Beyond this there is nothing to add to the notes contained in the previous issue of this Supplement (see this *Bulletin* 1937 Supp. p. 218\*).

*Veneral Diseases*—Cases of *syphilis* have not been seen among the natives but hospital cases during the year for *gonorrhoea* numbered 72 and of *granuloma venereum* 22.

In an Appendix to the Report under review Mr C. G. H. WHITE the Yaws and Hookworm Officer describes the work accomplished (see also this *Bulletin* 1937 Supp. p. 218\*). One treatment unit is maintained hookworm and yaws treatments being carried out concurrently. During the first nine months of 1936 attention was confined to the Island of Malaita where 6,967 persons were dealt with

In addition treatments are given at the Government stations and by Native Medical Practitioners on tour. An enormous improvement in the general health of the population is said to have resulted from the yaws and hookworm campaign the Reporting Officer adding "the efforts of this campaign are in all probability the factor which changed a declining population into an increasing one."

**Scientific**—Though no Laboratory Report is supplied a number of special investigations were carried out by members of the Medical Department during the year and these enquiries might be noted under this heading—

**Dr H. B. HETHEINGTON**—Investigation of an epidemic on Malaita. The disease proved to be influenza. A report was submitted to the Resident Commissioner. **Dr N. CRICHLAW**—Survey of health conditions on Rennell Island. A special report was submitted to the Resident Commissioner. Investigation and report on health conditions among the labour of the Vanikoro Kauri Timber Company with special reference to beriberi. **Mr F. T. STACKPOOL**—Survey on health conditions on Lord Howe Island. A special report was submitted to the Resident Commissioner. **Mr C. G. H. WHITE**—Census of the natives of Rennell Island. Native Medical Practitioner **George BOGESE**—Leprosy survey on Isabel.

**Financial**—Total medical expenditure for the financial year 1935-36 amounted to £8,804 a sum which represented 15 per cent. of the revenue of the Protectorate.

#### Gilbert and Ellice Islands Colony (1936)

These islands, formerly a Protectorate, were annexed to the Empire in November 1915. The Gilbert group lies between 4°N and 3°S latitude and 172° and 177°E longitude and consists of 16 islands with several small dependent islets. The Ellice Group, between 5° and 10½°S latitude and 176°E and 179 58°W longitude, comprises 9 islands. Ocean Island (Pagan) is the seat of Government and was proclaimed British in 1900. Fanning Island and, to the north-west of it, Washington Island were included in the Colony in 1916 and Christmas Island in 1919.

**Local Statistics**—These are compiled from figures supplied by the various Native Government Scribes. Data available for the year under review are as follows—

Race	Estimated Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Europeans	222	—	—	1	4.1	0	—
Gilbert Islanders	26,879	942	36.6	1,240	48.2	241	255.8
Ellice Islanders	4,123	187	46.6	103	25.6	38	203.2
Fanning	703	28	40.5	16	23.1	6	214.3
Asatoka	883	—	—	3	5.8	0	0
"Floating Natives"	956	?	?	?	?	?	?
<b>Totals</b>	<b>33,876</b>	<b>1,167</b>	<b>34.5</b>	<b>1,363</b>	<b>41.1</b>	<b>285</b>	<b>246.3</b>

The above birth and death rates are taken as published in the Report under review but *all would appear to be incorrectly calculated* (see this *Bulletin* 1936 Supp p 213\* and 1937 Supp p 219\*) The correct rates should be as follows —

Item	Europeans	Gilbert Islanders	Ellice Islanders	Banabans	Asiatics	Total
Birth Rates	—	34.9	45.4	39.8	—	34.2
Death Rates	4.4	45.9	24.9	22.8	3.3	40.2

The Report supplies details of the population with birth and death rates for each of the individual islands of the Colony for the year under review.

*Maternity and Child Welfare Work* — The remarks under this heading are a repetition of the observations contained in the 1935 Report and were referred to in these pages a year ago (see this *Bulletin* 1937 Supp p 219\*).

*Public Health Sanitation etc* — Under this heading also nothing new is recorded and it is therefore unnecessary to repeat the previous summary describing the work (see this *Bulletin* 1937 Supp p 219\*).

*Port Health Work* — Ports of entry remain unchanged viz Ocean Island Tarawa Funafuti and Fanning Island. At Ocean Island 82 ships entered and quarantine imposed on the s.s. Willandra as one of the seamen was found to be suffering from typhoid fever and he was admitted to the British Phosphates Commissioners Hospital and died there. Against two Chinese recruit ships restrictions were imposed and only minimum contact between these ships and shore allowed. Twelve ships entered the port of Tarawa but no details appear to be available for Funafuti or Fanning Island.

*Hospitals Dispensaries etc* — The descriptions of these hospitals and their accommodation personnel services available etc. are a repetition of the descriptions contained in the 1935 and previous Annual Reports and have already been discussed in these pages. The reader is referred to this *Bulletin* 1936 Supp p 213\* and 1937 Supp p 220\* as regards the record of work dealt with during the year under review. This may be summarized as follows —

Hospital	In-patients	Deaths	Out patients
Tarawa Central	241	10	3,920
Mental Asylum Tarawa	14	1	—
Funafuti	165	10	2,816
18 Hospitals Gilbert Islands	4,548	468	37,239
7 Ellice Islands	896	19	13,597
2 Ocean Island	2,216	66	8,157

The small dispensaries maintained at Tarawa Beru and Abaiang, for the treatment of students at the King George V School Tarawa, those at the London Missionary Society School Beru and the inhabitants of these small islands continued to function as usual (see this *Bulletin* 1936 Supp p 213\* and 1937 Supp p 220\*) but no details of cases dealt with are supplied.



In accordance with usual practice all islands were visited by a European Medical Officer or a Native Medical Practitioner several times during the year though owing to transport difficulties and complete dependence on trading steamers whose itineraries are erratic these visits are occasionally apt to prove abortive (see this *Bulletin* 1937 Supp. p. 220\*)

Except for an epidemic of *measles* (see below) the general health of the community showed no abnormal features during the year under review the notes which follow briefly summarize the more important commentaries in the Report upon morbidity experience during 1936

*Smallpox* has never been encountered in the islands but the policy of compulsory vaccination introduced in 1935 has steadily been maintained 24,891 vaccinations have been carried out to date in 23 of the islands of the colony and only three islands with an aggregate population approximating 4 000 remain to be dealt with.

Though no serious outbreak of *influenza* occurred during the year it is stated that outbreaks of a mild nature invariably follow the arrival of an overseas vessel or vessels—the port of entry being first affected and the infection thereafter being carried to other islands by the local inter-island vessels Only four cases appear to have been dealt with at the Tarawa Central Hospital, but the Medical Officer Ocean Island reports that there approximately 400 cases occurred [Hospital Returns show 485 cases at the British Phosphates Commission Hospital, and five cases of influenza plus 37 of influenzal colds at the Banaban Hospital] though only a few were severe the main complications being peripheral neuritis and pneumonia.

It is stated that the incidence of *tuberculosis* continues to decline in the Gilbert Islands (see this *Bulletin* 1937 Supp. p. 220\*) the improvement being ascribed to the maintenance of constant vigilance for early signs of infection and the use of drugs and preparations of high Vitamin A and D content on the slightest suspicion of infected glands or lungs. But it is added that though the response to therapeutic action is often remarkable the incidence of the disease remains distressingly high, and that in the Ellice Islands the position is even less satisfactory Hospital in-patients for the disease were Tarawa Central Hospital 36 (33 of these for tuberculous glands) Funafuti Hospital 33 (all tuberculous glands) and the two Hospitals on Ocean Island 12 cases.

An epidemic of *measles* followed the introduction of the infection by a vessel from Fiji and gave rise to 14,282 cases with 100 deaths. *Chickenpox* described as a mild and innocuous disease, is said to be endemic and epidemic in the Colony *impetigo* is common among children but responds rapidly to usual treatment. Among 185 in-patients treated for various skin diseases in the hospitals on Ocean Island were 93 cases of *tropical ulcer* the latter condition receives no mention in the text of the Report.

In spite of sustained efforts during the past few years to reduce the numbers of *Aedes variegatus* the incidence of *filariasis* in the Ellice Islands continued high and *filarial hydrocele* and enlargement of the scrotum are common a few cases of filarial infection are also known to exist in the Gilbert Islands At the two hospitals on Ocean Island 23 cases of *filariasis* and 22 of *hydrocele* were dealt with 23 at Funafuti

Hospital and 32 operations for the radical cure of hydrocele were performed at the Tarawa Central Hospital.

*Dysentery* is endemic many of the cases of measles (see above) were complicated by dysentery with a high mortality rate. Though both types of the disease occur judged by clinical and therapeutic criteria, *amoebic* dysentery is the more prevalent. Flies abound in the majority of the villages and are the obvious medium for the dissemination of *Entamoeba histolytica*. From purely clinical data it is impossible to assess the incidence of the disease with any degree of precision. 48 cases (types undefined) were treated at the Tarawa Central Hospital and the same number at Fumafuti Hospital and 240 cases were treated at the two Hospitals on Ocean Island.

*Leprosy*.—The commentary contained in the 1936 Report is a verbal repetition of that in the Report for 1935 (see this *Bulletin* 1937 Supp. p. 211\*) with the following slight addition: two or three cases of leprosy were notified after the departure of the Naanikai patients to the Makogai Leper Asylum Fiji in 1935 no opportunity offered for their transport to the Leper Asylum on the islet of Naanikai in the Tarawa Lagoon and that Asylum remained unoccupied throughout the year under review.

*Venerereal Diseases*.—A few cases of *gonorrhoea* occasionally occur after the visits of overseas ships to the Colony but people affected attend early for treatment. *Syphilis* continues to be non-existent. No case of V.D. occurred among the inhabitants of Ocean Island, but 28 seamen received treatment during their stay in the port. The steady decline both in the incidence and the intensity of the manifestations of *yaws* continues during the year 11 700 injections of novarsenobillon were given at the various island hospitals. The disease is practically non-existent on Ocean Island.

*Other diseases* mentioned in the text or classified returns include *hookworm* of which a few cases are seen from time to time, though the disease does not seem to be gaining ground. No cases of *acute poliomyelitis* were reported though the disease usually occurs in the Ellice Islands.

In an *Appendix* to the Report under review Dr H. B. STEPHENS (Medical Officer for the British Phosphates Commission at Ocean Island and also Government Medical Officer for that Island) contributes his usual Annual Medical and Sanitary Report. The average population of the Island was 2 753. 74 children were born and 73 persons died during the year. The Banaban Hospital is undergoing reconstruction and should be complete in 1937. The other hospital of the British Phosphate Commission is in good order and condition. The volume of work dealt with during 1936 at these institutions was as follows:—

Institution	Europeans	In-patients				Out patients
		Chinese	Natives	Total	Deaths	
British Phosphate Commissioners Hospital, Ocean Island	64	523	1 445	2,032	38	3,267
Banaban Hospital	?	?	?	167	16	483

The sanitary condition of the Island was satisfactory frequent inspections were made by the Government Medical Officer and fortnightly inspections by the Native Medical Practitioner. The principal diseases treated during the year have already been the subject of brief mention in the preceding notes but it remains to add a word about *beriberi*. During the year under review 117 cases of the disease were treated in the two hospitals on the Island and 2 deaths were ascribed to this cause. It is said that the natives prefer tinned foods and that it is difficult to persuade them to eat fresh fruits and vegetables in sufficient quantities.

*Scientific*—The only reference to work which might fall under this heading occurs in the Report of the Medical Officer Ocean Island (see above) who states that "706 examinations and procedures were performed and that the Native Medical practitioner also used the Laboratory." No details are supplied.

*Financial*—No information supplied.

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## WEST ATLANTIC

## BAHAMAS (1936)

The Bahamas are a chain of coral islands lying between 21°42' and 27°34' latitude and 72°40' and 79°5'W longitude and are the most northerly of the British West Indian Colonies with the coast of Florida to the north west and Haiti to the south-east. There are about a score of inhabited islands of which New Providence is the chief and contains the capital Nassau. The total area of the archipelago is 4 404 sq miles or about half that of Wales.

*Isal Statistics*—The estimated population for the year under review was 66,219. Registered births numbered 1,973 giving a crude birth rate of 29.8 per 1 000 and registered deaths 1 127 with a resulting death rate of 17.0 per 1 000. [There is something very wrong about the calculations presented in the Report where the birth rate is given as 32.9 and the death rate 18.8 per 1 000.] The deaths of infants under one year are not given. The New Providence Infant Welfare Association recorded 603 live births, 29 stillbirths and 40 deaths under one year. If stillbirths are included, [Stillbirths should be excluded—infant deaths in this case would number 11.]

*Maternity and Child Welfare Work*—At the Bahamas General Hospital 346 normal labour cases were conducted during the year. The Ante Natal Clinic operated by the Roman Catholic Sisters and attended by Dr M HARE a private practitioner continues to do good work. 932 attendances were recorded. The Infant Welfare Service now under the control of the Health Department is in charge of a graduate nurse and visited by a part time medical practitioner at the four clinic centres. 810 new cases, 4 178 home visits and 8 830 attendances were recorded. Lectures on nutrition etc. are given to nurses and midwives in training at the Bahamas General Hospital. On completion of the undergraduate course in general nursing each nurse is required to devote three months with the Infant Welfare Organization so as to gain practical experience in the instruction of mothers in the rearing of their infants. During the year 24 probationer nurses and 3 midwives were in training.

*School Hygiene*—The information under this heading is meagre. Periodic inspections of the Boys Industrial School were carried out by the Assistant Medical Officer and the general health reported to be good. During the past five years lectures on diet and nutrition have been given at the General Hospital to Public School Teachers attending their annual convention. It is hoped to provide for regular medical examinations of school-children throughout their school life.

*Public Health Sanitation etc*—The Report again observes health of the Colony remained much the same as in former years. The sewerage system continues to be extended. 49 additional connexions were made during the year and there are now 361 buildings connected to the system. The disposal of refuse is not discussed in the main text of the Report. In a separate report contributed by the Chief Sanitary Officer brief reference is made to this branch of work, while in the financial statement it is noted that refuse collection and street-sweeping

costs amount to 57 per cent of the total expenditure on all Sanitary Services. The City water which is analysed weekly has so far maintained a high standard of purity. An investigation of the purity of supplies obtained from private wells was carried out out of 67 wells examined 65 were found to contain contaminated water and were closed. *Davies foodshops* slaughtered animals etc. continued to be regularly inspected. The deficient diets of the labouring classes give rise to nutritional disturbances typical diets described give on generous calculations only 2,000 calories per day. Pellagra is common and is responsible for considerable illness and debility. Special attention is being devoted to the nutritional problem in the Colony with a view to effecting desirable improvements. In an Appendix to the Annual Report the Chief Sanitary Inspector describes the work of his department.

*Port Health Work*—During the year 609 vessels and 257 aeroplanes were granted pratique no diseases of a quarantinable nature were reported.

*Hospitals Dispensaries etc*—The tabulated facts relating to the in-patient treatments at the various institutions read as follows —

Institution	Admissions	Hospital Deaths
Alexandra Hospital	2 777	11
Victoria Jubilee Infirmary	114	47
Laurelto	—	—
Mental Hospital	63	14
Private Patients Building	73	11
Totals	3 027	283

In another Table the Alexandra Hospital is credited with 3 134 admissions and in the Return of Diseases and Deaths (In-patients) total admissions presumably for all institutions appear as 2,420 and deaths 177.

Out-patients in receipt of treatment numbered 26,500. The training of nurses and other personnel continues the educational course of new entrants has been raised and the Nurses training course extended from three to four years (see also *Maternity and Child Welfare Work* above). Steps have been taken to provide certain areas of the Out Islands with first-aid "doctors" suitable candidates are given six months training at the Bahamas General Hospital. Another department has been to replace unqualified attendants at the Mental Hospital by student nurses under the charge of a graduate nurse. The principal diseases treated in order of numerical importance were said to be syphilis pulmonary tuberculosis gonorrhoea, pellagra, and enteric fever.

Twenty cases of enteric fever with three deaths were notified. Of the total cases recorded 17 occurred in the Southern District, infection being traced in each case to polluted water supplies from private wells. Following investigation the latter were closed (see also *Public Health* above). Anti-typhoid inoculations carried out numbered 4,247. Dysentery is unmentioned in the text of the Report, though its importance is emphasized in the Laboratory Report but Hospital

Returns have 40 cases of which 29 were amoebic infections 6 deaths were ascribed to the disease. There were also 74 cases of *diarrhoea and enteritis* (31 in children under two years) with 10 deaths.

*Tuberculosis* is an important killing disease in the Colony. In-patient cases for all forms of the disease totalled 114 with 47 deaths. 97 of the cases and 38 of the deaths were ascribed to the *pulmonary* form of the disease. Efforts are being made to isolate early cases (see this *Bulletin* 1937 Supp p 224\*) otherwise sufferers do not seek hospital admission until *in extremis*. Other respiratory affections treated included 62 cases of *bronchitis* with one death and 38 cases of *pneumonia* with 7 deaths.

Mention has already been made of the prevalence of *pellagra* in the Colony (see *Public Health* above). It may be noted that 39 in-patients received treatment for the disease and 7 died (see also this *Bulletin* 1936 Supp p 217\* and 1937 Supp p 224\*).

With regard to *helminthic diseases* the Report again observes. *Ascaris oxyuris* and *trichuris trichiura* infections are frequently seen (see this *Bulletin* 1937 Supp p 224\*). Only 24 cases of *ascariasis* appear in the Hospital Returns.

All the *venereal diseases* occur. In-patients treated for *syphilis* numbered 136 and 18 died. For *gonococcal infections* 48 *granuloma venereum* 9 and *soft chancre* 4. At the V D Clinic 718 persons received treatment for *syphilis*. The policy of the Department is to give a minimum of 28 weeks continuous treatment consisting of 8 weekly injections of Thio-Bismol.

Of *other diseases* it is observed that 23 cases of *measles* and 16 cases of *mumps* were notified but the Report states numerous cases of *mumps* and *measles* occurred and that the actual incidence of cases is unknown for very few cases are reported. *In-patient* cases of *cancer* numbered 14. The Laboratory Report states that *post mortems* emphasized the importance of malignancy in the Colony and reports 5 deaths due to this cause although only one death appears in the Hospital Returns.

*Scientific*—The Laboratory is well equipped to undertake clinical pathological and public health work. During the year a large number of samples of milk and water were dealt with. A miscellaneous range of specimens was also examined, though the results of these examinations are not stated except in such general terms as a fair number of stools submitted were found to contain *E. histolytica* and no malarial parasites were recognized during the year in blood smears submitted.

No special research work was undertaken.

*Financial*—The financial year was altered to correspond with the calendar year. The total expenditure of £20,974 represents expenditure on Medical and Sanitary Services for the period April 1st to December 31st, 1936.

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# BARBADOS (1936-37)

Barbados, the most easterly of the West India Islands, is situated in latitude 13°4' and longitude 59°37'. Its length is 21 miles, its breadth 14 and it has an area about 166 sq miles, a little larger than the Isle of Wight.

*General*—The personnel of the staff of the Office of the Chief Medical Officer remains the same as before except that the post of Sanitation Officer was filled in November 1936. The unsatisfactory arrangements previously described are still in being (see this *Bulletin* 1935 Supp. pp 212\*-213\* 1936 Supp. pp 218-219\* and 1937 Supp. p 225\*).

*Vital Statistics*—At the end of the year 1936 the population was estimated to be 188,294 an increase of 3,382 over the preceding year. Registered births numbered 5,933 and deaths 3,459 the resulting crude birth and death rates, presumably calculated from an estimated mid-year population of 186,603 being 31.80 and 18.54 respectively. Registered deaths are shown as before with distinction of cause and in age groups for each of the eleven Parishes. There were 1,175 infant deaths, giving an infant mortality rate of 196 per 1,000 live births (illegitimate 238 legitimate 939).

*Maternity and Child Welfare Work*—The Infant Welfare Clinic managed by a Committee of twelve ladies is staffed by a part time Medical Officer and two nurses and has eight lady enquiry officers. In the mortality returns 42 deaths of women are ascribed to conditions of Pregnancy Labour and the Puerperal State. At the end of the year 495 women were registered under the provisions of the Midwives and Nurses Registration Act. 230 as midwives only 77 as nurses only and 168 in both capacities. Rules for conduct and training of midwives are being drafted and it is hoped that courses of lectures will soon begin.

*School Hygiene*—The bad sanitary conditions previously reported in the elementary schools have been improved, and in many cases new schools have been built to prevent overcrowding. The two Government Industrial Schools are satisfactory. Milk has been included in the diet given to the pupils of these since December 1936.

*Public Health Sanitation etc*—An important duty of the Sanitation Officer is the inspection of elementary school-children. A disinfection apparatus has been ordered and when it arrives will be placed at the disposal of all the Parochial Authorities for a nominal sum. Health propaganda, with films and lantern exhibitions is to be held on a large scale during the next year for although sanitation is improving it is slow and there is need for advertisement of health matters. During the last quarter of the year under review a course of instruction for Sanitary Inspectors was started by the Sanitation Officer and it is proposed to hold the Examination of the Royal Sanitary Institute in Barbados in November 1938.

*Port Health Work*—During the year 1,197 vessels entered the port, 146 of which arrived from ports infected or suspected of being infected with quarantinable diseases. 189 persons were placed under surveillance consisting of 99 passengers and 70 seamen. Most of these arrived from Martinique where an outbreak of diphtheria was reported early in the year. One case of smallpox occurred in the Colony and

was immediately isolated. Two of seven contacts vaccinated and kept under observation at the Quarantine Station developed smallpox in a mild form. All other contacts were vaccinated and no further cases occurred. Other persons sent to the Quarantine Station for observation during the year consisted of 781 labourers and 1 seaman. Trapping and poisoning of rats was continued no *Pestis* were found in 208 rats examined by the Government Bacteriologist.

*Hospitals etc*—The General Hospital is now controlled by one Board instead of two bodies as formerly. No Visiting Physician has yet been appointed and Surgeons do the work a Physician would normally perform. The Nurses Home is being completed and wards for V D are to be available from April 1937. No statistics of patients treated in hospital are supplied (see this *Bulletin* 1936 Supp. p. 219\* and 1937 Supp. p. 226\*). There are 243 beds available.

At the *Mental Hospital* there were 592 patients in residence at the end of March 1937 but there is overcrowding. At the *Leprosy Hospital* there were 75 inmates at the beginning of the year and there have been 2 new admissions, 9 re-admissions, 1 discharge and 14 deaths. £5-16 2s. 0d. was paid out during the year to assist persons who have undergone treatment and have been discharged as cured or non-infective. At the *Prison Hospital* 73 males and 8 females were treated. The *Parochial Almshouses* are still overcrowded but the sanitary arrangements have been greatly improved.

*Malaria* does not occur in Barbados and in spite of rigid search anophelines are not found. Cases of *filariasis* are few and do not now constitute an important health problem.

*Enteric fever* fluctuates from year to year and 163 cases were notified compared with 218 in 1935 and 119 in 1934. Deaths numbered 40 of which 28 occurred in the Parish of St Michael and 24 between the ages of 10 and 30. *Dysentery*, *diarrhoea* and *enteritis* still rank first as causes of death. The figures are *dysentery* 60 deaths, *diarrhoea* and *enteritis* (under 5 years) 424 (5 years and over) 58. Chlorination of the water supply is now carried out and may be effective but these diseases are largely fly borne.

*Tuberculosis* is increasing and 96 cases were notified compared with 74 in 1935 and 93 in 1934. Deaths numbered 134 of which 120 were due to the pulmonary form. A committee has been appointed to go into the cause of tuberculosis and recommendations that all dairy cattle be tuberculin tested will be made. Tuberculosis hospitals are being erected at a few of the Almshouses. *Pneumonia* caused 206 deaths and *bronchitis* 65.

*Syphilis* was the cause of death of 172 children under 5 and of 68 persons of 5 years and over. At the clinic 857 new and 779 old cases of *syphilis* and 874 new and 287 old cases of *gonorrhoea* were seen and for all venereal diseases 23,571 attendances were recorded.

No deaths were due to *smallpox*. The cases seen are described above (see *Port Health Work*).

Other important causes of death, as in previous years were *nephritis* 275, *cancer* 140 and *pellagra* 73. These are still not commented on in the Report.

The work of the *Bacteriological and Pathological Laboratory* has enormously increased and leaves no time for specialized work. An assistant to the Government Bacteriologist is badly needed.



*Financial*—Total parochial expenditure on sanitation during the year 1936-37 amounted to £14 002. Parochial Poor Law Administration cost £41,591

### BERMUDA (1936)

The Bermudas or Somers Islands form a cluster of some 300 small islands in the Western Atlantic in latitude 32°15'N and longitude 64 51'W. The nearest mainland is Cape Hatteras in North Carolina, 590 miles distant. Most of the islands are mere rocks and less than a score are inhabited. The total area is estimated at 19 square miles.

*Vital Statistics*—Of the total estimated population of 31,831 the coloured members of the community accounted for 18 740. *Registered births* numbered 747 and *deaths* 291. The crude birth rate was 23.5 (in the Report given as 23.8) and the death rate 9.1 (in the Report given as 9.27) per 1 000 population. Several slight errors appear to have crept in during the calculation of rates the published and corrected rates are as follows—

Item	As Published			Corrected Rates		
	Total Population	Whites	Coloured	Total Population	Whites	Coloured
Births	23.8	16.4	29.2	23.5	16.3	28.6
Deaths	9.27	8.8	9.6	9.1	8.9	9.4

The infant mortality rates were for the whole community 50.9 for whites 45.9 and for the coloured 52.9.

*Maternity and Child Welfare Work*—Nurses of the Bermuda Welfare Society (see this *Bulletin* 1937 Supp. p. 228\*) paid 1,899 ante-natal visits and attended 227 confinements while the total record of visits (exclusive of attendances at Baby Clinics) in connection with the work of the Society was returned as 25,312. The nurse of the Hamilton Parish Nursing Association paid 3,507 district and clinic visits and attended 39 maternity cases during the year. In seven of the nine parishes of the Colony Baby Clinics are established. A short statistical study of maternal mortality in Bermuda during the past 12 years shows that the coloured maternal mortality rate is approximately double the corresponding rate for whites and that a relatively greater frequency of toxæmia of pregnancy among coloured women was an outstanding feature.

*School Hygiene*—Dr FOURNIER examined 611 school-children in the Eastern District and reported improvement in general condition, but no diminution in the incidence of carious teeth and diseased tonsils. Similar findings were reported by Dr SWEENEY among school-children in the Western District. Dr Fournier inoculated 180 children in the Eastern parishes with diphtheria anti toxin, but in the Western parishes where Dr Sweeney reports an apparent resentment to diphtheria immunization only 20 children were inoculated. During the past eight years about 3 000 children have been immunized.

by the Department. Various improvements are noted in school premises and new school buildings are to be erected in Sandys and Pembroke. The Department of Education continues to expand its physical equipment and to provide generous playing fields. School instruction in the principles of hygiene continues to be given by Mrs Stanley Martin in the Central and Western districts.

*Public Health Sanitation etc*—Considerable sanitary improvement was effected in the centre of the town of St. George by replacing objectionable earth privies with flush toilets. The flushing system of the town was also improved by the installation of a sizeable tank from which the water was piped to establish centres. These beginnings are regarded as introducing an era of sanitary betterment. A survey was made through the populous Smiths Hill District with a view to the provision of roads sewers etc. Though the Watlington Water Company makes provision for piped supplies (see this *Bulletin* 1935 Supp pp 217-218\*) the fact remains that the individual household tank remains Bermuda's method of ensuring a supply of water. Provision for storage of supplies is inadequate and further regulations dealing with these matters are envisaged in the Amenities Bill and revision of the Public Health Act soon to go before the Legislature.

Malaria control measures were continued. New works included the trenching of Warwick Marsh and the reclamation of dumping of two acres of swampy land. The anti-rat campaign was continued with undiminished vigour throughout the year.

Dairies and milk supplies received the attention of the Department as formerly. Of milk samples regularly tested for butter fat etc. it was reported that samples from 24 out of 34 dairies averaged over 4 per cent butter fat. Among 509 cattle in the Western parishes tested for contagious abortion, 57 were definitely and 125 slightly infected (see this *Bulletin* 1937 Supp p 229\*).

The Report under review contains a detailed summary of the inspections made in 1936 under the provisions of the Public Health Act.

*Port Health Work*—The only information under this heading records the arrival of one seaplane and that of the 80,586 visitors to the Colony. 23,300 were on cruising vessels.

*Hospitals Clinics etc*—The Bermuda Nursing Association aided by a Treasury Grant took over administrative charge of the Cottage Hospital. Between May 1st and the end of the year 91 patients were admitted. 81 were discharged cured or improved and 8 died. A Board of Trustees administers the King Edward VII Memorial Hospital. No details are supplied of the work of this institution.

A clinic is to be established to enable men and women of humble means to secure advice on such questions as pregnancy sterility, contraception, etc. (see this *Bulletin* 1936 Supp p 222\*) and a proposal to provide facilities for the periodic examination of hotel and other employees is under consideration. Out patient clinics for general treatment are maintained by the Department at a number of centres.

From the brief references to morbidity experience during the year the following items are selected—

The most frequent causes of sickness were German measles 200 cases mumps 148 chickenpox 73 scarlet fever 44 measles 7 whooping cough 6 and diphtheria 5 cases. No deaths were attributed to any of these.

## BRITISH HONDURAS (1936)

causes. There were also 7 cases of *typhoid fever* with one death the latter a coloured male.

*Tuberculosis* (all forms) was responsible for 18 cases with 10 deaths, 13 of the cases and 7 deaths being ascribed to the *pulmonary* form of the disease. *The Silver Jubilee Memorial Pavilion* (see this *Bulletin* 1937 Supp. p. 229\*) has yet to be started but plans were under discussion and work should commence in 1937.

No case of *smallpox* was recorded. 225 vaccinations were carried out and 131 parents registered as conscientious objectors.

*The Venereal Diseases Clinic* continues to function at the hospital, where it is said "attendance has dropped to an average of about ten." Drs. Sweeney and Fournier carried out necessary treatments in their respective districts. Preparations are being made for a more active campaign against *syphilis* and *gonorrhoea*.

The condition of the nine inmates of the *Isolation Hospital for Lepers* remains about the same. No new admissions were recorded.

Chronic ailments of the circulatory system and kidneys seem to preponderate and are the cause of a large number of deaths. *Diseases of the circulatory system* caused the deaths of 67 and *nephritis* of 28 persons. *Cancer* which passes unmentioned in the Report was responsible for 22 deaths.

*Financial*—Expenditure on Medical and Health Department services amounted to £11,834 and on the *Isolation Hospital* £1,995. Total revenue of the Colony is not stated.

THE REPORT FROM BRITISH GUYANA HAD NOT BEEN RECEIVED AT THE TIME OF GOING TO PRESS.

## BRITISH HONDURAS (1936)

British Honduras is on the east coast of Central America, with Yucatan (Mexico) on the north and north-west and Guatemala on the west and south and on the east the Bay of Honduras (Caribbean Sea). It has an area of about 8,398 sq. miles, i.e. about the size of Wales.

*Vital Statistics*—The relevant facts for the six Districts and for the Colony as a whole may be set out as follows—

District	Population	Births	Birth Rate	Deaths†	Death Rate	Infant Deaths	I M R.
Belize	21,633	744	34.8	380	17.5	78	103.4
Corozal	8,119	270	33.1	248	30.2	64	237.9
Orange Walk	6,447	195	29.9	207	32.1	47	281.4
Stann Creek	6,250	194	31.4	102	16.3	19	90.0
Toledo	6,808	231	33.9	167	24.5	30	119.0
Cayo	7,264	236	32.4	155	21.3	49	207.6
The Colony	56,071	1,879	33.5	1,256	20	287	152.7

† The statement of deaths as presented in Table 2 of the Report is in error and not in agreement with the figures.

*Maternity and Child Welfare Work*—The information under this heading is meagre. At the Belize Hospital 381 women were treated for diseases of pregnancy childbirth and the puerperal state and 10 of them died. 1 158 mothers and expectant mothers attended as out patients in connexion with the Maternity Ward. [Data for the District Hospitals are lacking. It would appear that a page or pages have been omitted in error for in the Return of Diseases for the District Hospitals the list of causes is incomplete.] The British Honduras Infant Welfare League continued to function as formerly and at the Belize Clinic 6,398 attendances were recorded. In four districts Infant Welfare Clinics are reported to have been established but for only two of these are any details supplied. In the Orange Walk District the average attendance is given as 40 and in the Stann Creek District where the clinics are held every fortnight and where each child is visited by a trained midwife once a month it is said there are 218 babies on the register. The Toledo District Report observes: "No provisions obtain at the hospital for conducting labours normal or abnormal and the mother has to rely on the expensive because unsafe help at the hands of local midwives" (see also this *Bulletin* 1937 Supp p 236\*).

*School Hygiene*—Systematic inspection of the schools in Belize was begun only late in the year and no details of any value are available. For the rest the only other available information appears in the Report of the Medical Officer for the El Cayo District where it is stated that latrine accommodation in the schools is inadequate that two schools dispose of their sewage by a modern system and a third has installed a "Kentucky Automatic Flush tank" which functions satisfactorily.

*Public Health Sanitation etc*—Dr R. L. CHEVERTON the newly appointed Senior Medical Officer records with deep regret the death from tetanus of Dr J. MOIR the former Senior Medical Officer in September 1936 and briefly testifies to the value of the contributions made by his predecessor for the health betterment of the Colony.

A slight but definite improvement in the general health of the population during the year is recorded possibly due to the improved economic conditions in the Colony malaria deficiency diseases venereal diseases and pulmonary tuberculosis are the outstanding health problems with which the Medical Department has to deal.

As regards *sewage disposal* though it is said individual septic tanks are becoming increasingly popular among the better class residents the majority of householders empty their utensils into the river canals or sea. A new regulation will empower the Local Authority to enforce the provision of latrines and water closets on all premises. In the Districts generally pit-latrines are commonly used but in remote country villages the most primitive methods continue to exist. Public Health Ordinance No 16 of 1927 provided for a proper *water supply* for every house in Belize but this regulation has not been enforced and supplies are obtained from the storage of rain water in vats tanks and other receptacles on the premises of householders to augment these supplies six tanks were built during 1936 and pipes lead to street hydrants conveniently located. In the Districts water supply methods are similar to those obtaining in Belize while in remote rural areas rivers and wells are used. Some improvement in *housing*

conditions is recorded all new erections must conform to the requirements laid down in the new building regulations which became law during the year.

*Port Health Work*—During 1936 quarantine regulations were in force against the Central American Republics Mexico and Brazil. Irregular traffic between the Colony and neighbouring republics must necessarily go for the greater part unchecked by reason of the lack of adequate control staff (see also this *Bulletin* 1937 Supp. p. 237\*).  
*Hospitals Dispensaries etc*—There are six Hospitals in the Colony—one for each District. At the Belize Hospital 1,522 patients were admitted, 1,554 were treated, and 82 died. In addition there were 17,131 attendances for treatment at the Out patient Department during the year. The record of admissions and treatments at the remaining five district hospitals cannot be given, for as already mentioned in the section *Maternity and Child Welfare Work* above these hospital returns are incomplete. The following notes summarize the principal items of morbidity experience featuring the Report under review.

*Malaria* continues to sap the vitality of the population in the public hospitals of the Colony the 864 cases treated represented 21.5 per cent of all cases of sickness treated. The distribution of types of infection reads *benign tertian* 92, *quartan* 25, *subtertian* 188 and unclassified 559. There were 53 hospital deaths and 91 deaths in the Colony ascribed to the disease. The data contained in Hospital Returns are not always in agreement with statements contained in the Reports of the several District Medical Officers.  
 Nine cases of *blackwater fever* were treated in public hospitals with three deaths.

The unusually heavy rains experienced during the year are held responsible for increased breeding of anophelines and increased incidence of malaria. Preventive measures continued to be applied within the limits of available funds but the latter did not permit of adequate attention being paid to preventive work. Bush and weeds were cut and removed periodically low lying areas were drained, and stagnant pools water receptacles etc. culled.

The vector or vectors of malaria in British Honduras are said to be unknown but *A. albimanus* is from its geographical distribution, thought to be the principal vector (see this *Bulletin* 1937 Supp. p. 237\*).

One non fatal case of *smallpox* appears in the Hospital Returns credited to Stann Creek District. Elsewhere the Report refers to two cases of *alastrim* in Corozal, four in Orange Walk and two in Belize yet in the Report of the Medical Officer Orange Walk, it is stated "seven cases occurred with one death, the Medical Officer Stann Creek, says five cases of suspected *alastrim* came under observation in the district and were suitably dealt with and the Medical Officer Corozal, reports four cases discovered and segregated." The original infective case is believed to have entered from Mexico owing to financial stringency no sanitary control of the extensive frontier is at present available. Primary vaccinations performed during the year totalled 857.

No case of *yellow fever* has been recorded since 1921 but since that year the mosquito index is said to have increased considerably (no

details given) and what gives rise to great anxiety is the fact that *Ad. aegypti* abound in the Colony. One hundred bloods were sent to the Rockefeller Institute New York for investigation for the presence of protection against the virus of yellow fever. Several of the bloods of adults showed protective antibodies. One of the bloods of the children in Belize—a girl aged 14 years who had never left the city since birth—also showed the presence of protective antibodies. The evidence is slender but the question arises as to whether there exists in Belize a dormant type of yellow fever analogous to that occurring in West Africa.

Of enteric fever it is said one case was notified. Hospital Returns record one case of typhoid and three of paratyphoid fevers. Eighty-six cases of dysentery were treated in public hospitals the distribution of types of infection being amoebic 59 bacillary 9 and unclassified 18. Eight deaths were ascribed to this cause. It may also be noted that among the uncertified deaths in the Colony occur 34 in which the cause is stated to have been dysentery diarrhoea and bowels. Faulty methods of disposal of excreta continue to be mainly responsible for the disease which is particularly prevalent in outlying rural areas. Fifty-six cases of tuberculosis (all forms) were treated in public hospitals 46 of these being cases of the pulmonary type of the disease and of the seven hospital deaths four were due to phthisis. Medically certified deaths in the Colony due to tuberculosis numbered 48 but it is also said there were in addition 104 uncertified deaths in which the cause was ascribed to consumption cough or cold. Tuberculosis is said to be prevalent but accurate statistics are not available patients do not seek treatment until the disease has reached a hopelessly advanced stage.

**Helminthic Diseases**—In the absence of accurate surveys and dependable records it is difficult to say to what extent these diseases are responsible for sickness among the general population. Hospital returns record 52 cases (of which 33 were ankylostomiasis) but the Toledo District Report alone mentions some 200 cases treated. It is stated that *ankylostomiasis* is prevalent in all districts and that other helminthic diseases are also common. Stool examinations can be carried out only occasionally on hospital in patients and on but few of the out patients. The Medical Officer Toledo District observes: "The type of people affected do not wear shoes. few of the patients seen wear shoes except when on holiday in the town."

**Veneral Diseases** are said to be extremely prevalent and that cases are never cured for with the relief of acute symptoms the patient discontinues the course of treatment—in fact all that applicants for treatment ask for is relief from pain and inconvenience. Cases treated in the public hospitals were for syphilis 67 gonorrhoea 82 and other veneral diseases 40. In the Toledo District climatic bubo is reported to be very common. There is a male V.D. Ward in the Belize Hospital but no female V.D. Ward yet the female infective and untreated population is the great reservoir of these diseases. Among other diseases commented upon in the Report under review the following call for mention. Whooping cough and influenza were very prevalent and contributed largely to the death rate. In Corozal District an epidemic of whooping cough in the early part of the year was responsible for the deaths of a number of children under one

year while in December a particularly virulent type of influenza was encountered. In Orange Walk District also whooping cough was unusually severe, and in one village of 30 families no less than 45 deaths occurred, chiefly among infants and children of school age. Skin diseases are met with everywhere. In El Cuyo District an extraordinary amount of contagious *eczema* was met with. The peculiarly intractable *nephritis* previously mentioned (see this *Bulletin* 1937 Supp. p. 239\*) continued to increase in incidence. The Medical Officer Corozal District reports. Numbers of cases of swollen children with all the symptoms of an acute *nephritis* will be found on investigation to be due to an overdose of *chenopodium* and calls for the restriction of the sale of the drug.

As a result of the continued depression the dietary of the people, especially in the villages has become more and more restricted until now it consists chiefly of corn. In the Toledo District *nutritional macrocytic anaemia* is a very prevalent manifestation of dietetic deficiencies. Nearly all the cases occurred in women, either in pregnancy or as the sequel to an attack of malaria. Treatment with intramuscular liver extract and marmite proved very successful but these preparations are beyond the means of most out-patients. (See also the work of Dr GIGLIOLO among East Indians in British Guiana, this *Bulletin* 1936 Supp. pp 228\*-229\*)

*Financial*—Medical Department expenditure amounted to \$88,910 during the year under review

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### JAMAICA (1936)

Jamaica, an island in the Caribbean Sea, about 90 miles south of Cuba, within 17°42' and 18°32'N. latitude and 76°11' and 70°23'W. longitude. It is the largest of the British West Indian Islands, being 144 miles long and 50 at its greatest breadth and having an area of 4 450 square miles, or about half that of Wales. Kingston, the capital, is on the south coast in the County of Surrey. The Cayman Islands and the Turks and Caicos Islands are dependencies of Jamaica.

*Vital Statistics*—The estimated population at the end of the year was 1 138,558. Registered births numbered 36,561 and deaths 19 629 the resulting birth and death rates being returned as 32·4 and 17·7 respectively. [A mid year population of 1 130 170 would give a birth rate of 32·4 and death rate of 17·4 on the basis of the end-of year population the rates would appear to be 32·1 and 17·2 respectively.] Approximately 72 per cent. of the births were illegitimate and 43 per cent. of the deaths were medically certified. *Undefined fevers*, *congenital debility*, *infantile convulsions* and *pulmonary tuberculosis* figured among the most prominent causes of death.

The *infant mortality rate* for the year under review is stated to have been 130 per 1 000 live births.

*Maternity and Child Welfare Work*—Local Boards employ and subsidize 48 part time registered midwives. These women are required to reside in specified districts in order to be available for cases of labour for which they are entitled to collect such fees as they can. The

service has not proved a great success mainly owing to the lack of understanding on the part of the less educated classes of the importance of skilled attention in pregnancy cases. In these circumstances Education in Maternity and Child Hygiene Work is to be included in the experimental programme of Public Health Nursing which is to be undertaken on a co-operative basis with Local Boards of Health. To the Jubilee Maternity Hospital (see this *Bulletin* 1937 Supp p 239\*) 423 married and 1,396 unmarried patients were admitted during the year 1,357 live births and 23 maternal deaths were recorded. The Ante-Natal Clinic at this institution grows increasingly popular patients dealt with numbered 2,259. The Jubilee Maternity Hospital is the only hospital providing service of this kind. At Public Hospitals outside Kingston in patients treated for diseases of the puerperal state numbered 695 with 44 deaths and out patients 439. The Infant Welfare Association in Kingston, which is subsidized by Government reported 17,748 attendances at such clinics and 5,622 attendances of babies.

*School Hygiene*—In the corporate area of Kingston and St. Andrews (see this *Bulletin* 1937 Supp p 240\*) 4,921 school-children were examined the percentages of defects recorded being granulated lids 36 per cent carious teeth 30 septic tonsils 22 and defective vision 3 per cent. The great majority of school-children in the rural districts of the Corporate Area are said to be infected with helminths and that even in the urban areas incidence is fairly high. As regards the nutritional condition of the children the school Medical Officer classified 56 per cent as good or very fair 30 per cent subnormal and 14 per cent as bad. The Dental Clinics in the area have been in operation for 10 years and have effected remarkable improvements in the oral condition of school-children. The Eye Clinic dealt with 1,726 new cases. It is said that the School Medical Staff in the Corporate Area is inadequate out of 25,000 school-children on the registers some 5,000 only can be examined each year.

Outside the Corporate Area it has not yet been found possible to undertake the routine medical inspection of school-children with the provision of a few Public Health Nurses demonstrations are being staged in a number of parishes. The nine *Parochial School Dental Clinics* dealt with 20,715 new cases.

The general health of the inmates of the Government Industrial School, Stony Hill was reported on the whole to have been satisfactory.

*Public Health Sanitation etc*—The reorganized Medical Service is said to be functioning well and without difficulties. The reorganization of the Public Health Department on a permanent basis now provides Health Officers for all parishes in the Island under the scheme many of the medical and subordinate personnel of the various *Commissions* were absorbed (see this *Bulletin* 1937 Supp p 240\*).

As regards *sewage disposal* it is stated that in the compulsory sewered area better progress was made than formerly in connecting up unsewered premises to sewers. Local Boards of Health reported the construction of 12,442 new latrines during the year. Latrine surveys were carried out in 25 districts in 8 parishes during the course of these surveys 18,439 premises were inspected, 69.7 per cent were provided with sanitary latrines 18 per cent with insanitary latrines and the remainder were homes lacking latrines.



Nearly all towns with more than 1 000 population are provided with piped water supplies but means of continuous purification of supplies are available in five towns only. Moreover it is only in Kingston and its suburbs that purification is continuously reliable and the standard of bacteriological purity adequately maintained. The sources of supply in the majority of cases are open rivers or springs inadequately protected and liable to gross pollution (see *enteric fever* hereafter) though 214 spring sources are provided with protective works designed to exclude surface pollution (see also this *Bulletin* 1937 Supp. p. 240\*). Special efforts were made to stimulate Local Boards to improve parochial supplies.

The control of food supplies for human consumption continued to receive the close attention of the authorities. The Sanitary Staff increased the number of their inspections and condemnations of various foods exposed for sale. Malnutrition is said to occur to an unsatisfactory degree especially among children of the poorer classes unbalanced dietaries, inadequate use of protective foods and poverty are the principal factors responsible. The Educational, Agricultural, and Medical Departments are engaged in co-operative efforts to bring about improvements.

The Central Housing Advisory Board completed its enquiries during the year and submitted a scheme for town planning and the improvement of slum areas. The scheme was accepted by Government.

Part II of the Report is devoted to the presentation of three special reports. These are —

(a) *Reports of Mobile Health Units.*—Two such Units were at work during the year in districts heavily infected with hookworm and yaws. Reported details include populations dealt with in various areas, numbers of persons examined, infected and treated, together with references to sanitary conditions latrine construction, educational work etc.

(b) *Report of Special Tuberculosis Studies in Jamaica* contributed by Dr C. W. WELLS. The first part of this Report deals with the activities of the Travelling X-ray Unit during the first six months of the year. The second section deals with the results of an experiment in rural public health nursing with special emphasis on tuberculosis. During the first six months of the year attention was devoted to a single parish but later the experiment was extended to include two other parishes.

(c) *Special Tuberculosis Studies at the Mental Hospital, and Stony Hill Industrial School.*—This comprehensive Report is submitted by Dr E. W. FLANNERY and contains in addition to explanatory text tabulated results of tuberculin tests X-ray examinations list of controls and vaccinated cases of persons having pulmonary tuberculosis deaths by age sex etc.

The Tuberculosis Reports have been reviewed at some length in the *Bulletin of Hygiene* 1938 v. 13 194 and the work of the Mobile Health Unit described in previous issues of this Supplement.

*Recommendations* include (a) The provision of a Sanitary Engineer with special experience in water purification and anti-malarial work. (b) Provision of a School Medical Service with facilities for the treatment and correction of defects. (c) Modification of existing regulations with respect to food handlers and conditions under which food is

prepared and exposed for sale  
Nursing Service

(d) Development of a Public Health

*Port Health Work*—The Quarantine Department was reorganized with increased personnel and included in the Public Health Department. Jamaica is not a signatory to the International Sanitary Convention of 1926 port sanitation has not been extended to the sanitary examination of vessels and no law exists at present which gives the Port Sanitary Authority the right of entry for the sanitary examination of vessels except when cases of infectious disease occur on shipboard. The Report adds there is no semblance of attempts at rat-proofing of docks and warehouses in the vicinity of the docks by their owners. During the year 1,338 vessels entered Kingston and Port Royal and 135 at the outports. one case of modified smallpox was reported. *Hospitals Dispensaries etc*—The institutions of the Medical Department comprising 20 General Hospitals a Maternity Hospital Lunatic Asylum and Lepers Home have an aggregate accommodation of 3,540 beds. At some hospitals arrangements had to be made for the provision of beds considerably above official accommodation to meet increased demands.

During the year special accommodation was provided for maternity cases at three General Hospitals and it is hoped to extend similar facilities to all other District Hospitals. In spite of improvements carried out from time to time hospital buildings are said to be in bad condition and are in urgent need of rebuilding or repair. The work of the various hospitals during the year under review may be set out in the following manner—

Institution	In patients			Out patients
	Admitted	Treated	Deaths	
Public Hospital Kingston	8 563	8 926	712	169 821
Maternity	1,819	1,819?	23	2,259
Lunatic Asylum	374	2,575	241	—
19 District Hospitals	?	23 021	1 196	91 785
Lepers Home, Spanish Town	38	187	15	—

Separate reports of the year's work are contributed by (a) The Medical Superintendent Kingston Public Hospital (b) The Resident Medical Officer Jubilee Maternity Hospital (c) The Medical Superintendent Lunatic Asylums (d) Medical Officer Lepers Home (e) and Medical Officers of Prisons (see this *Bulletin* 1937 Supp p 242\*) 204,527 attendances for treatment were recorded.

Considerable progress was made during the year towards regularizing the conditions of service of *hospital nurses*. Probationer nurses were removed from district hospitals and a fixed cadre of nurses and ward maids introduced. The *training of nurses* is carried out only at the Kingston Public Hospital the course extending over three years. During the year 32 nurses from Kingston Hospital and 35 from District Hospitals passed the final examination and 5 students qualified as dispensers.

The principal items of morbidity experience commented upon in the Report are referred to in the following summaries —

*Notifications of infectious diseases* totalled 3 404 of which 1 453 were cases of pulmonary tuberculosis 1 278 typhoid and 319 dysentery.

*Malaria* — The spring rainfall, which was well above the average favoured the maintenance of high incidence of the disease. In the corporate area of Kingston and St. Andrews malaria assumed serious epidemic proportions following the spring rains due to the extension of the coastal swamps and establishment of ponds and pools further inland. In July anopheline surveys were carried out the main breeding places demarked and control measures applied. In other parts of the Island smaller outbreaks occurred again due in many cases to the formation of ponds and lakes. Preventive measures were applied and new cases declined rapidly thereafter. Hospital Returns show that at the Kingston Hospital 1 359 in-patients were treated for malaria 42 died and there were 2 035 malaria out patients. Types of infection are not differentiated. Among 2 824 in-patients treated at the District Hospitals 2 381 were *benign tertian* 43 *quartan* 188 *subtertian* and 14 *cachectica* 110 of these patients died. Malaria out patients treated at these hospitals numbered 14 378. There were also 14 patients treated for *blackwater fever* and 3 died.

It may be noted that while in the whole Island 672 deaths were ascribed to malaria, 2 243 were said to be due to *undefined fever* and only 19 of them were medically certified.

At the Laboratory 6 882 blood films were examined (only 4 478 in 1935) for the presence of malaria parasites 39.5 per cent. were positive and 84 per cent. of the positives showed subtertian parasites.

Of *fevers of the enterica group* 1 278 cases were notified and 288 deaths were recorded. Cases occurred throughout the year with incidence at its lowest in December when 42 cases were notified. The record of incidence between parish and parish ranges from a single case in the parish of Port Royal to 189 cases in Kingston alone, or 337 cases in the corporate area of Kingston and St. Andrew. The Report refers to a "decline" in incidence in the Corporate Area which "is associated with the improvements in purification of the water supply begun in 1930." In this connexion it should be noted that in the Corporate Area there were 328 cases and 67 deaths recorded in 1935 and 337 cases with 57 deaths in 1936. In the early months of the year there was an explosive water-borne epidemic in the town of Chapeltown (parish of Clarendon) when 64 cases and 6 deaths were recorded in the whole Clarendon area 183 cases were notified. The usual control measures were applied extensive surveys of parochial water supplies latrines etc. were carried out by the Sanitary Staffs. At the Laboratory where agglutination tests were applied to 4 474 samples of blood serum, 1 012 agglutinated positively with *Bact. typhosum* 864 gave doubtful reactions 5 were positive with *Bact. paratyphosum A* and 4 with *Bact. paratyphosum B*.

During the year 319 cases of dysentery were notified, distributed as to 142 amoebic, 19 bacillary and 158 unclassified. Of the total cases notified, 121 were treated as hospital in patients and 10 died. A water borne epidemic at Yallahs in the Parish of St. Thomas gave rise to 70 cases and one death blood samples from cases indicated infection with *Bact. dysenteriae* Flexner V. On the other hand the Laboratory

Report records examinations of 312 faecal specimens of which two only were positive for *Bacillus dysenteriae* while 1 016 other faecal specimens were positive in 230 cases for amoebic unspecified. Deaths due to *diarrhoea* and *enteritis* in the Island numbered 547.

Of *pulmonary tuberculosis* 1 453 the four parishes of Kingston St Andrew St Catherine and St Ann accounted for 63 per cent of the total cases and 53 per cent of the total deaths. The quality of the information relating to the disease is said to continue to improve diagnosis in practically every case being checked by bacteriological and/or X-ray examination. The rural dispensary services were continued and extended particularly in St Ann where a full time framed Medical Officer was appointed.

Demonstrations in various parishes the Rockefeller Foundation Public Health nurses have already been referred to in the provided one full time tuberculosis nurse for work in two parishes. The special tuberculosis studies have been referred to in the latter part of the section *Public Health* above. At the Laboratory 400 out of 1,341 specimens of sputa were positive for *Mycobacterium tuberculosis*. The Report observes in connexion with tuberculosis that hospitals were taxed beyond their capacity but no mention seems to be made of the special tuberculosis institution which was to be erected (see this Bulletin 1937 Supp. p. 244\*).

Forty five cases of *leprosy* were notified during the year. At the end of the year there were 232 known lepers in the Island 169 of them being inmates of the Lepers Asylum. At the latter institution there were 38 admissions 3 discharges and 15 deaths recorded. The female quarters of the Lepers Asylum are overcrowded and increased accommodation is urgently needed. At the Laboratory among 180 smears examined, 97 were positive for *Mycobacterium leprae*. *Genereal Diseases*—Hospital records supply the following data relating to patients treated—

	Kingston Public Hospital	District Hospitals
<i>Syphilis</i> —		
In-patients	449	1 072
Deaths	23	40
Out-patients	?	8,982
<i>Gonococcal Infections</i> —		
In-patients	317	1 093
Deaths	1	2
Out-patients	?	3 441
<i>Soft Chancres</i> —		
In-patients	?	70
Out-patients	?	270

At the Women's Free Clinic 1 633 new cases of *syphilis* and 3,252 of *gonorrhoea* were treated. Government has accepted for adoption in 1937 a scheme which with financial assistance by the Colonial Development Fund, will provide for the establishment of special V.D. Clinics in four townships and improved treatment facilities at all hospitals. In anticipation of

this scheme a Men's V.D. Treatment Centre was opened in Kingston in October and 1,332 new patients were treated for syphilis and 1,221 for gonorrhoea. The question of venereal diseases in ports and among seamen was also under consideration and a Port Welfare Committee was formed to deal with these matters.

The *Laws Control Programme* inaugurated in 1933 is said to be effecting a steady reduction in the numbers of active and infectious cases. During the year under review Sanitary Staffs discovered 15,456 cases among a population of 448,283 persons. At the Kingston Public Hospital 9 in-patients received treatment and at the District Hospitals 67 in-patients and 10,629 out-patients were dealt with. The work of the Mobile Units in areas of heavy infection has already been the subject of brief mention (p. 246\* *supra* see also this *Bulletin* 1937 Supp. p. 241\* and 244\*).

Other diseases referred to in the Report include the following — Chronic nephritis caused the deaths of 770 persons; hospital records show that 3,747 in-patients were treated for diseases of the genito-urinary system (non-venereal) 248 died and 5,443 out-patients were treated at District Hospitals for these affections. For diseases of the respiratory system 1,563 persons were dealt with as hospital in-patients 245 died and 2,578 were treated as out-patients at District Hospitals. It may be noted also that 700 deaths were ascribed to pneumonia in the Island during the year. It is said that the "great majority" of the school-children in the rural districts of the Corporate area are known to be infected with *helminths*. Mention has been made of the work of the Mobile Treatment Units but it remains to say that 281 persons received treatment as in-patients for *helminthic diseases* 22 died and 9,351 were treated as out-patients at the District Hospitals; also it is noted that at the Lunatic Asylum where the stools of 215 patients were examined 64 contained *ascylostoma ova*. Cancer caused the deaths of 338 persons in Jamaica during 1936 and hospitals dealt with 311 cases with 33 deaths.

Dr. J. J. CALVERT, Acting Superintendent of the Lunatic Asylum contributes a comprehensive report dealing with the work of the institution. During the year under review 574 patients were admitted, 241 died, 270 were discharged and at the end of the year there were 2,064 patients still in residence. Serious overcrowding in the female division continues and additional accommodation is urgently needed.

*Scientific* — The Central Laboratory is said to provide adequate and sufficient public health service though facilities for the chemical analysis of foods are desirable. A branch laboratory for the western end of the Island is mentioned as an additional requirement. The record of work shows a further increase with 57,950 specimens examined, an increase of 48 per cent. over the 1935 records. Many of these examinations and their results have already been referred to in the preceding notes. It remains to add that routine syphilis serological examinations totalled 23,621 with a positivity of 43 per cent. Smears microscopically examined for gonococci numbered 5,333 and of these 37 per cent. were positive. The increase in this branch of work (the number of smears examined was more than five times the combined totals of the five preceding years) was due to the establishment of the male and female V.D. Clinics in Kingston. Stool examinations numbered 4,221 (as compared with 2,893 in 1935) with 64.2 per cent.

TURKS & CAICOS ISLANDS (1936)  
 positive for helminths and 24 1 per cent for amoebae (unspecified)  
 Of 2 709 stools examined for helminths 945 contained ankylostoma ova  
 110 ascaris and 308 trichuris of 1 016 stools examined for amoebae  
 (unspecified) 230 were positive  
*Financial*—Total expenditure on Medical Department services  
 amounted to £199 338 or 9 per cent of the total expenditure of the  
 Colony during the year under review

THE REPORT ON THE CAYMAN ISLANDS FOR 1936 HAD NOT BEEN  
 RECEIVED UP TO THE TIME OF GOING TO PRESS

### TURKS AND CAICOS ISLANDS (1936)

The Turks and Caicos Islands geographically, are a sort of annexe of the Bahamas group but in 1873 were annexed to Jamaica which lies about 450 miles to the south west. They are situated between 21° and 22° N latitude and 71° and 72° 37' W longitude and have an area of about 166 sq miles. The chief island Grand Turk is 6½ miles long 1½ broad.

*Total Statistics*—The population figures resulting from the 1921 Census in 5 612 persons continue to be used (see previous issues of this Supplement) (Birth and death rates calculated on the basis of a population enumerated 15 years previously seem rather a waste of time and such assessments may be dangerously misleading) Registered births during 1936 numbered 194 and deaths 195 the latter being an increase of 115 deaths over the 1935 experience it is noted 43 deaths occurred between the ages of 60 and 90 years. The infant mortality rate is given as 128. The

*Public Health etc*—Shortage of funds precluded the undertaking of any major schemes of work. Sanitary conditions were satisfactory and the general health of the people said to be fair. No quarantinable diseases were reported and the isolation premises were not in use during the year. Drought conditions adversely affected agricultural work and gave rise to some food shortage the demand for locally produced salt declined and labourers were in consequence deprived of work. Fresh vegetables fruits beef mutton etc. were imported in adequate quantities but could not be purchased by the labouring classes who stood most in need of such foods.

The dental inspection of school-children was continued 119 pupils received free treatment. Some elementary instruction in the principles of hygiene was given by teachers in charge of the schools. An increase in the incidence of *pellagra* is noted. No details of out-patients treated are supplied but 7 persons were admitted to hospital and 6 died. Other morbidity experiences are the subject of vague reference. For example the number of children suffering from diseases of the digestive tract is given as about 25. Among adult patients muscular and articular rheumatism were said to have been in evidence, and the same indefinite comment is made applicable to the incidence of *eczema impetigo* and *pemphigus* among

children who were affected to about the same extent as in the preceding year [when these ailments were described as "less prevalent"] Malaria was only occasionally encountered there were numerous cases of influenza and several cases of *intermittent fever* and tuberculosis but leprosy remains about the same, (i.e. five known cases) *Ascaris* and *oxyuris* infestations were said to be not so much in evidence as in the previous year (in the previous year they were described as again evident) and the same observation is applied to the incidence of *venereal diseases*.

The only precise information relates to patients in the hospital, Grand Turk where 7 *pellagra* cases (8 deaths) and one each for *nephritis* (one death) *adenitis gangren* of the *loos confinement* and *diarrhoea* were admitted for treatment

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## LEEWARD ISLANDS

### Antigua (1936)

Antigua, with Barbuda and Redonda forms one of the Presidencies of the Leeward Islands. It lies in W longitude 61° 45' and N latitude 17° 8'. Its circumference is about 54 miles and area 108 square miles, or about half the size of Middlesex.

*Vital Statistics*—The estimated population according to the Returns of the Registrar-General was 34,230. The registered births are given as 1,270 and deaths 697 but from these must be taken 83 stillbirths if birth and death rates are to be correctly calculated. Excluding the stillbirths, birth and death rates are 34.7 and 17.9 per 1,000 respectively and not 37.1 and 20.4 as stated in the Report. Infant deaths numbered 132 giving an infant mortality rate of 111.2 per 1,000 live births (see this *Bulletin* 1937 Supp. p. 248\*).

*Maternity and Child Welfare Work*—The Annual Report of the Superintendent of Midwives states that the 25 Nurses and Midwives attended 833 confinements in village and estate areas during the year. In addition they carried out an amount of first-aid and treatment work under the direction of District Medical Officers. To the three crèches 7,302 infants were admitted during 1936. All babies are weighed at weekly intervals and weight records are maintained. The health of crèche babies is said to have shown great improvement.

*School Hygiene*—A reference to this branch of work occurs in the Report of the Medical Officer District "D" in the words "Periodic visits were paid to the schools in the district and occasionally short addresses were given to the children on Public Health and Personal Hygiene. The health of boys at the Training School was good and physique is said to have improved. The Dental Surgeon visited 21 schools during the year treated 1,035 children, and gave talks on oral hygiene at each school.

*Public Health Sanitation etc*—The references under this heading are meagre. In the City of St. John nine applications to construct *septic tanks* were approved, bringing the number of such installations up to 119. Services concerned with *night scavenging* and the collection and disposal of refuse were regularly continued. There are five

Medical Districts but only from the Reports of two are extracts provided. In District A *housing and general sanitary conditions* are said to be poor in District D also housing conditions of many of the estate labourers are poor—overcrowding is common. *Water supplies* are a subject of mention only in the District D report where the supply to villages is said to have been constant throughout the year (see this *Bulletin* 1937 Supp p 248\*)

Included in the Annual Report under review is an extract from the report of the Veterinary Surgeon. Reference is again made to the heavy mortality among cattle due to tuberculosis (see this *Bulletin* 1937 Supp p 248\*) Under the Milk By Law 286 cows were examined and certified as healthy for the supply of milk.

*Hospitals Dispensaries etc*—To the Holberton Hospital 932 patients were admitted 1 000 were treated and 115 died during the year under review preventable disease again accounted for a large proportion of all admissions. *Out-patient* work is said to have been extended but the only specific reference to this side of Public Health activity occurs in the Report of the Medical Officer District A in the words "During the year 5 000 patients consulted me 20 per cent of whom complained of respiratory influenza etc"

The *training of nurses* at the Hospital is provided for and regular courses are followed certification is dependent upon examination results

*Malaria* is probably the most serious health problem in Antigua many villages are in close proximity to swamps and much low-lying land becomes swampy in wet weather. The rainfall in 1936 was the highest on record for 25 years. Anti-malarial works are carried out to the limits imposed by financial considerations but to deal effectively with the malaria problem would demand financial resources far beyond the means of the Medical Department. During the year under review 3 459 cases of the disease were recorded with 40 deaths incidence increased from September to a peak in December when 728 cases and 14 deaths were registered. *Subtertian* malaria was the most prevalent type of infection. At the Laboratory where 2,041 blood films were examined 587 were found to contain malaria parasites the distribution of types among these positives being *subtertian* 91·8 per cent *quartan* 6·8 and *benign tertian* 1·5 per cent

In Medical District D two non fatal cases of *blackwater fever* were treated. Hospital Returns mention two cases with one death.

Patients treated in Hospital for *enteric fever* numbered 25 and 4 of them died. At the Laboratory the Widal Test was applied to 32 samples of serum, 17 reacted positively with the specific agglutinins of the enteric bacilli. Fifteen patients suffering from *bacillary dysentery* received treatment as hospital in-patients and 4 died. The Medical Officer District A reports he treated 204 patients for dysentery in his area during the year

*Pulmonary tuberculosis* was responsible for 17 in-patient cases with 8 deaths but it is noted that in Medical District D 36 cases were dealt with and in Medical District A 4. Notified cases and deaths in the whole of Antigua were 51 and 29 respectively

*Leprosy*—There are 33 patients in the Leper Home and 27 known cases outside. The disease appears to be increasing and in view of the



common tendency to overcrowding some form of compulsory segregation may be necessary to control the spread of the disease.

*Incural Diseases.*—Both *syphilis* and *gonorrhoea* are very prevalent but their seriousness is too often regarded lightly (see this *Bulletin* 1937 Supp p 249). Quite young children of both sexes are said to be seen suffering from gonorrhoea. Hospital Returns show 18 cases of syphilis (8 deaths) and 8 of gonorrhoea. At the Laboratory the Kahn test was applied to 496 samples of blood sera 238 reacting positively. *Lues* is said to be prevalent amongst children up to 12 years of age, but does not seem to be increasing there are about 50 cases in the words of the Report.

*Other diseases mentioned include* in Medical District D 248 cases of influenza and 355 of *ascariasis* in Medical District A 125 cases of various skin affections and 4 of *anterior poliomyelitis*. Among hospital in-patients were 22 cases of *ulcers* 21 of *burns and scalds*—the latter mainly among children and evidencing a lack of care on the part of parents. The frequency of signs of *malnutrition* among children is mentioned and it is said that there is an increase in the incidence of *carcinoma* of the breast uterus and colon.

*Financial*—Total expenditure on Medical Department Services during 1936 amounted to £16,561

### Dominica (1936)

Dominica, the largest and most southerly island of the Leeward Islands Colony is of volcanic origin. It measures about 29 miles long and 15 broad, and has a total area of 304 square miles or about double that of the Isle of Wight. It is situated between 15°20'–15°45'N latitude and 61°15'–61°30'W longitude and lies 95 miles south of Antigua.

*Vital Statistics.*—At the end of the year the population was estimated to number 48,290. Registered live births numbered 1,508 and deaths 654. Crude birth and death rates are given as 31.58 and 13.71 per 1,000 of the mid-year population the latter is not stated but would be 47.688. Stillbirths numbered 63 and infant deaths 150 giving an infant mortality rate of 99.6 per 1,000 live births.

Of the live births 841 were illegitimate and of the stillbirths 44. The death rate is the lowest recorded and the infant mortality rate has only twice before been below 100.

*Maternity and Child Welfare Work*—In addition to the three Nurse-midwives employed as described in these pages a year ago five similar appointments have been made in other areas where formerly no trained Nurse-midwives were available. There are now 98 midwives registered under the Midwifery Ordinance and 28 women holding certificates of Proficiency in Midwifery in the Island. Returns show that one in every three women in labour was attended by a trained midwife in 1936. At the Roseau Hospital 284 cases were admitted to the Maternity Ward and 234 confinements were conducted at this Hospital four pupil midwives completed their training and were

awarded their certificates. Weekly ante-natal and Infant Welfare Clinics are held in the Out patient Department of the Roseau Hospital and were attended by 499 expectant mothers and 197 infants. At the Portsmouth Hospital 14 normal labour cases were conducted in this town the St John's Child Welfare Committee continued to hold their weekly clinic which was attended by 71 infants. A third Infant Welfare Centre was opened in Mangot in March 1936 up to the end of the year 80 infants had been enrolled. At the various centres quantities of cod liver oil milk etc are distributed free to necessitous cases. The Report observes Digestive disturbances among infants due to improper feeding are exceedingly common and evidences of malnutrition following upon digestive disturbances are seen in children up to five years of age.

*School Hygiene*—The schools were regularly visited by the Chief Medical Officer and by District Medical Officers *malaria* *yaws* *intestinal parasites* received particular attention and it is again recorded that ulcers continue to be a chief cause of school absence (see this Bulletin 1937 Supp p 250\*)

During the year a *nutrition survey* of 2 794 children attending 14 Government Elementary Schools was undertaken. Height and weight records at ages are tabulated. On the basis of American standards it was found that 21.9 per cent were of standard weight or above 45.7 per cent less than 10 per cent below standard weight or 32.4 per cent were 10 per cent or more below standard weight also dental caries was observed in 20.4 per cent of the children examined, enlarged tonsils in 10.4 per cent, anaemia and skin diseases each present in about 8 per cent.

*Public Health Sanitation etc*—During the year under review the Island remained free from any dangerous epidemic disease. As regards general sanitary measures the *sewerage system* in the town of Roseau was further extended. The conservancy system of communal latrines was maintained as were the public latrines in country villages but no additions were made. Methods of collection and disposal of refuse in Roseau and Portsmouth remain unchanged (see this Bulletin 1935 Supp p 244\*)

Collection and incineration of refuse was undertaken in four of the more important villages elsewhere sanitary inspectors continued their efforts to promote cleanliness in the villages. Minor drainage of anopheline breeding places was carried out in a number of areas.

No extensions to existing *water supplies* were carried out. With regard to *food* it is pointed out that the native dietary consists largely of locally grown foodstuffs (the soil is fertile and land is available to labourers on very easy terms). Enquiries into the average diet of the labourer show that it is deficient in fats and to some extent in protein the poorer classes or unemployed labourers are often unable to procure either meat or milk.

*Port Health Work*.—No details of ships entering Roseau are supplied but it is stated no case of quarantinable disease was reported during the year.

*Hospitals Dispensaries etc*—The four Hospitals and 20 Dispensaries continued to function as previously described (see this Bulletin 1937 Supp. p 250\*) The year's work at the four Hospitals the Home for the Aged (Infirmary) and the Dispensaries may be set out as follows—

Institution	Beds	In-patients	Deaths	Out-patient	Dispensary District Attendants
Rowan Hospital	102	1 445	105	1,950	Rowan 1 054
Portsmouth	35	588	34	554	Portsmouth 8 600
Marigot Cottage Hospital	6	120	4	—	Marigot 10,35
Grand Bay Cottage Hospital	4	120	3	—	Grand Bay 20 000
Infirmary	30	29	8	—	Total .. 63 07

The principal items of morbidity experience may be summarized as follows —

**Malaria**—Incidence was lower by comparison with experience during previous years, 2,629 clinically diagnosed cases being reported by Medical Officers during the year many of these are said to have been cases of relapse. Among 506 thin blood films examined 178 were found to contain malaria parasites among the positives *subtertian* infections accounted for 72 per cent *benign tertian* 19 per cent and *quartan* 9 per cent. Hospital in-patients treated for malaria totalled 217 in 60 cases only was the type of infection defined these comprising 50 *subtertian* 8 *benign tertian* and 2 *quartan*.

Twenty-one cases of enteric fever were notified with four deaths. Five cases were attributed to insanitary village conditions seven to polluted water supplies. The usual measures were adopted to prevent spread 500 persons received T A B inoculations. Eighteen cases received hospital in patient treatment but in none of these was the type of infection defined. District Medical Officers reported 168 cases of all forms of *dysentery* with 10 deaths. Among 30 cases treated in hospitals 23 were suffering from the amoebic type of the disease. Thirty-two out of 43 deaths at all ages due to *diarrhoea and enteritis* occurred among children under two years of age during the year 355 children in the latter age-group were treated for diarrhoeal diseases.

Among the 90 cases of *tuberculosis* (all forms) 71 were of the *pulmonary* type of the disease 48 deaths were ascribed to pulmonary tuberculosis and six to other forms of the disease. Deaths in the Island due to *pneumonia bronchitis* and other *respiratory affections* totalled 51.

**Helminthic diseases** were responsible for nearly 25 per cent. of all cases treated at the Dispensaries. Infestation with *ascaris* and *hook worm* is widespread and several cases of *Taenia solium* were seen. Helminthic diseases are reported to have caused the deaths of 44 persons during the year the majority among children under five years of age.

Of the 33 known cases of *leprosy* (see this *Bulletin* 1937 Supp. p. 252\*) two died during the year. A new case of *nerve leprosy* was reported, the patient being a young man who had lived in the Guianas. A scheme has been approved for the construction of a leper home and work is in progress.

**Veneral Diseases**.—District Medical Officers reported 614 cases of *syphilis* and 571 cases of *gonorrhoea* and its complications. At the four hospitals 59 cases of *syphilis* 61 of *gonococcal infections* and 10 of *soft chancre* were treated. It is stated that though patients attend

earlier for treatment few continue their attendance until cure complete. Of years 1 042 cases were notified 2,375 patients attended for treatment and 12 000 injections of arsenical and bismuth preparations given.

With regard to *other diseases* commented upon in the Report it is said that *diseases of the digestive system* account for a high proportion of cases seeking treatment and that many of these are seen in debilitated persons suffering from deficiency of protective food in their diet. Nutritional diseases were responsible for 42 deaths. *Skin diseases* are common and a great number of cases of *tropical ulcer* are seen. About 80 cases of *chickenpox* and 50 of *influenza* were reported during the year.

*Financial*—Actual expenditure on Medical Services amounted to £10 645 a sum which represents 20 per cent of the revenue or 16·6 per cent of the total expenditure of the Presidency in 1936

### Montserrat (1936)

Montserrat, named by Columbus after a mountain in Spain lies in 16° 45' N latitude and 61° W longitude 27 miles S W of Antigua. Its length is 11 miles and its greatest breadth 7 miles and its area 32½ sq miles.

*Vital Statistics*—The estimated population at the end of the year was 13 630. *Registered births* numbered 536 and *deaths* 203 the resulting birth and death rates being 39·3 and 14·9 per 1 000 population respectively. *Stillbirths* numbered 19 and *deaths of infants under one year* 62. The infant mortality rate is stated to be 118·7 per 1 000 live births but if all the 536 births were live births then the rate would be 115·7.

*Maternity and Child Welfare Work*—The only reference seems to be that in the Maternity Ward at the Glendon Hospital 113 cases of normal and 6 cases of difficult labour were conducted and that the post of Government Midwife was abolished as it was felt that the well-equipped maternity ward at the hospital met all requirements.

*School Hygiene*—Periodical visits continued to be paid to elementary schools by Medical Officers though it is said such visits are largely of negative value owing to the practice of parents to keep even slightly ailing children at home. Efforts are being made to improve the nutrition of young and growing children. The elements of hygiene are taught in schools and efforts made to encourage children to practise hygienic habits in their daily lives.

*Public Health Sanitation etc*—Adverse weather conditions—severe drought during the first four months followed by excessive rainfall throughout the remainder of the year—had the effect of reducing the Island's chief crop of Sea Island Cotton to about 30 per cent of normal yield and as a direct consequence much privation was experienced among the labouring classes and the general health of the population suffered. Though *latrine accommodation* for the general public is still inadequate it is noted that the majority of new houses have water borne systems of *sewage disposal* to septic tanks and that bucket latrines are fortunately becoming more unpopular. The question of improving and modernising methods of *scavenging and disposal of*

*refuse* is under consideration. The water supply to Plymouth has been further augmented. With regard to *housing* buildings damaged by earthquakes have been replaced by more substantial buildings the Concrete Housing Scheme financed by the Colonial Development Fund is arousing local interest. Medical Officers and Sanitary Inspectors continued their routine inspections and submitted their reports at the quarterly meetings of the Board of Health.

*Hospitals Dispensaries etc.*—The Glendon Hospital moved from the earthquake damaged building (see this *Bulletin* 1937 Supp. p. 253\*) into temporary wooden quarters in March and despite limited accommodation and other inconveniences 434 persons received in-patient treatment and over 300 were dealt with as out patients. Hospital deaths numbered 15. Dispensary clinics were held each week at three centres visits to a fourth centre were discontinued as it was decided cases were too few in number and of too trivial a nature to justify the service. Among the principal diseases treated the following occur.

One case of *malignant malaria* was seen in a seaman who ultimately succumbed to the disease. *Filariasis* is said to have been "much in evidence" in recent years (no figures are given) and that in spite of efforts to eradicate the offending mosquito the pest remains. A severe case of *typhoid fever* developed in a young boy arriving from a neighbouring island no other cases occurred. Four deaths due to *pulmonary tuberculosis* and five to other forms of *tuberculosis* were registered during the year. There do not appear to have been any hospital in-patients treated for *tuberculosis* but there were 4 cases of *pneumonia* with 2 deaths.

*Syphilis* continues to be a somewhat rare disease but the "usual incidence" of *gonorrhoea* and *soft chancres* is mentioned. the number of cases of *yaws* continues to decline and severe cases are seldom seen. *Helminthiasis* was responsible for five in-patient hospital cases. the routine treatment of school-children—among whom *ascaris* infestations are for the most part frequent—was continued with successful results.

During the months May–July an epidemic of *measles* chiefly among children of school age occurred and led to the closing of the elementary schools. No details are supplied as to the number of cases which were said to be mild in type. no deaths occurred. *Gastro-enteritis* is said to have accounted for many deaths among young children. 21 deaths were ascribed to *diarrhoea and enteritis* among children under 2 years of age. An epidemic of *influenza* with a marked tendency to development of *broncho-pneumonia* occurred late in the year. deaths due to *broncho-pneumonia* totalled 10.

[The nomenclature of diseases used in this Report does not conform with Titles in the International List. For example, three titles in the group *Diseases of the Mouth etc.* find a place in the group *Diseases of the Digestive System* of the International List. In order to facilitate inter-Colonial comparability of data it might be considered advisable to adopt the Intermediate International List or the List specially recommended for use in British Colonial Possessions.]

*Financial.*—Expenditure on Medical and Sanitary Services amounted to £3,375 of which £2,121 were spent on the maintenance of Hospitals and Charitable Institutions.

# St. Christopher and Nevis with Anguilla (1936)

The islands of St. Christopher and Nevis with Anguilla are part of the Lesser Antilles group and constitute one of the five Presidencies forming the Leeward Islands Colony in the West Indies. Their total area is about 150 sq miles.

*Vital Statistics*—The relevant facts for the year under review read as follows—

Item	St. Kitts	Nevis	Anguilla	The Presidency
Estimated Population	18,395	13,542	5,517	37,454
Births	876	330	142	1,348
Birth Rate	44.4	23.6	24.8	36.0
Deaths	668	216	90	974
Death Rate	33.2	14.5	15.4	28.0
Infant Deaths	134	55	17	206
Infant Death Rate	164.1	177.4	124.1	162.9
Stillbirths	59	20	5	84

In the Preface to the Report it is remarked that infant mortality rates as presented in previous Annual Reports were inaccurately calculated. All such rates for the past 10 years have been revised. *Maternity and Child Welfare Work*—The Baby Saving League continues its activities and with the assistance of the annual grant contributed by Government maintains the six crèches established in St. Kitts (see this *Bulletin* 1937 Supp. p. 254\*). The medical Officers of District No. 1 and District No. 6 are both of opinion that much infant mortality is attributable to improper methods of feeding while the Medical Officer District No. 7 observes that children are undernourished and that fewer cases of yaws would occur with improved diets.

Of the 28 registered *midwives* supervised and supplied with dressings and drugs for their district work only 13 are paid by Government. During the year 549 first visits of mothers to midwives were recorded while midwives paid 211 visits to crèches 136 ante natal visits and 85 visits to infants. Admissions to the Maternity Ward of the Cunningham Hospital numbered 90 and there were two maternal deaths. To the Maternity Ward of the Alexandra Hospital, Nevis 73 mothers were admitted and delivered with 2 deaths and at the Pogson Hospital 16 such cases with one death were recorded.

Courses for nurses in general training midwifery etc. are organized at the Cunningham and Alexandra Hospitals.

*School Hygiene*—The principal information supplied which might be included under this heading results from the work of the Dental Surgeon who visited the children attending the primary schools in the three islands and the estate labourers in St. Kitts and Anguilla. He observes a marked improvement in the general health of both children and labourers though the children of the Anguilla schools (with the exception of those attending a named school) showed signs of under nourishment. During the course of these visits extractions for school children totalled 2,825. Elsewhere it is stated that all school latrines were treated regularly with an emulsion of crude oil and that the schools in St. Kitts have been supplied with urinals.

*Public Health Sanitation etc.*—From only one of the seven Medical Districts was the general health of the people reported to have been below par during the year under review. Anti-mosquito measures continued to be actively applied along the lines previously described (see this *Bulletin* 1937 Supp. pp. 254\*–255\*).

*General measures of sanitation* in the poorer parts of certain towns are described as anything but satisfactory. The water-carriage system of *sewage disposal* to septic tanks has proved unsatisfactory in some cases owing to the choking of drains caused by the practice of disposing of old clothes etc. *in closet pans* in these circumstances extension of the system cannot be encouraged. Other methods of disposal in use include *pail closets* and trench and barrel privies. *Water supplies* of Basseterre are liable to prove inadequate during drought periods. Recommendations have been made towards securing additional supplies. The stocking of the Basseterre reservoirs with goldfish has successfully dealt with the problem of *Bullinus* and *Planorbis* snails (see this *Bulletin* 1935 Supp. p. 247\*) there is now no trace of these creatures and bacteriological tests of the water always prove satisfactory.

*Port Health Work*—The Port of Basseterre has a Port Health Officer and quarantine disinfecting apparatus. It is said that no quarantinable cases have ever been recorded nor has the Quarantine Station been used as such at any time during the 20 years of its existence. Houses at this Station are in fact let as private houses, tenants being liable to evacuate premises required at 12 hours notice.

*Hospitals etc.*—Reports describing the year's work at the four Hospitals, two Infirmaries, the Leger Home and the Prison are presented in the Report under review. Mention has been made of the courses of training given to nurses (see above, *Maternity Work etc.*). During the year a fire which demolished the Nurses' quarters at the Cunningham Hospital, gave rise to much inconvenience and discomfort. New buildings are in course of erection. The record of work carried out at the four Hospitals reads as follows—

Hospital	In-patients	Deaths	Out-patients
Cunningham	891	84	?
Alexandra, Nevis	505	29	1
Pogson	67	5	76
Cottage, Anguilla	40	3	20

The principal diseases treated and commented upon in the Annual Report include those to which brief reference is made hereafter.

Reported cases of *malaria* totalled 131 and 2 deaths were ascribed to this cause. At the Cunningham Hospital 2 non-fatal cases of the disease were treated and also 29 cases of unspecified fevers with 5 deaths. At the Alexandra Hospital, Nevis 27 cases of malaria were admitted during the year. The absence of anophelines from St. Kitts and Anguilla is again commented upon (see this *Bulletin* 1936 Supp., p. 248\* and 1937 Supp. p. 255\*). The Medical Officer District No. 6 reports an increase in the numbers of cases of malaria, due in his opinion to heavier rains and consequent increase in the number of potential breeding places for anophelines.

It is stated that 308 cases of *filariasis* with 3 deaths occurred during the year only 8 of such cases are mentioned in the Hospital Returns.

Recorded cases of *enteric fever* show a considerable increase 250 as against 98 in the preceding year. In only 14 cases were blood samples forwarded to the Laboratory for serological examination and of these 5 showed *Bact typhosum* and one *Bact paratyphosum B* infections. The Medical Officer District No 3 reports an epidemic outbreak of the disease giving rise to 92 cases the majority occurring during the first six months of the year the infection seems to have been fly-borne. From District No 4 a few sporadic cases of paratyphoid were reported in Districts 5 and 6 diseases of the intestinal tract were responsible for many cases of sickness treated while the Medical Officer District No 7 remarks No typhoid was observed. Of *dysentery* 268 cases and 21 deaths were reported. The Medical Officer District No 7 says very few cases were seen in his area a result he attributes to the improved sanitary conditions of the villages. The Medical Officers of Districts Nos 3 and 6 refer to the occurrence of cases of diarrhoea and enteritis among young children.

Of *tuberculosis* 256 cases and 62 deaths were reported. Hospital Returns show that among 26 cases of tuberculosis (all forms) causing 8 deaths 18 of the cases and 7 of the deaths were due to the *pulmonary* form of the disease. In No 2 Medical District pulmonary tuberculosis is said to be decidedly on the increase in No 3 District where 26 cases and 9 deaths were ascribed to all forms of the disease 22 of the cases and 8 of the deaths were due to pulmonary tuberculosis in No 7 District the Medical Officer reports that pulmonary tuberculosis is the cause of one-third or more deaths from infectious diseases. A special hospital for the treatment of sufferers is a very real need in the Presidency.

*Helminthic diseases*—Infection with *ascaris* is said to be the rule rather than the exception among children of the lower classes. Medical Officers of No 2 and No 5 Districts both observe that such infestations are a common occurrence.

*Venereal diseases*—During the year 1 023 cases of *syphilis* and 778 cases of *gonorrhoea* were reported but it is added that there are good reasons for believing that these figures do not represent the true incidence of venereal diseases in the Presidency. According to the pie diagrams presented, illustrating the incidence of infectious diseases syphilis was responsible for 17 per cent. gonorrhoea for 12.7 per cent. and *yaws* for 26 per cent. of total cases of infectious diseases reported as regards deaths due to infectious diseases syphilis was responsible for no less than 31 per cent. of the total. According to the Reports of District Medical Officers venereal diseases are prevalent in Nos. 4 6 and 7 Districts in No 3 District little variation in incidence is noted, in No 5 District they form a very small proportion of all diseases treated while in District No 2 though syphilis shows signs of diminishing *granuloma venereum* is referred to as a fourth venereal disease which has come to take up its abode with us. At the Laboratory among 294 Kahn tests 135 gave positive reactions. Distance and the uncertainties of sea transport make the despatch of blood samples from No 5 District almost impossible as regards other areas it is hoped that the serological assistance available will be more widely used in the future by District Medical Officers.



Of *yaws* 1,556 cases were reported. The regrettably high incidence of the disease is ascribed to the fact that though appropriate treatment is available mothers do not realise the importance of the treatment of their children to complete cure.

*Leprosy*—The Medical Superintendent of the *Leper Home* reports that during the year one patient was admitted, 6 died, and one was discharged, leaving 47 inmates still under treatment at the end of the year. Methods of treatment previously described were continued (see this *Bulletin* 1937 Supp. p. 256\*). The 22 extern lepers attend regularly for treatment give no trouble and are said to do better than patients in close confinement.

With regard to other diseases mentioned in the Report under review it is noted the District Medical Officers of Districts No. 2, 3, 6 and 7 report outbreaks of *measles* which assumed epidemic proportions; the disease was mainly virulent in contagion, but mild in form. A mild outbreak of *influenza* occurred in District No. 6. In District No. 2 several cases of carcinoma of the uterus and breast were observed in women and of the tongue and skin in men. Troublesome and intractable skin infections were also seen in school-children. During the year 791 vaccinations were carried out in the various Medical Districts in the Presidency.

*Scientific*—At the Bacteriological Laboratory 473 specimens were dealt with, 294 of these being blood samples submitted to Kahn test (see above, *General Diseases*). Results of the various examinations are not recorded.

*Financial*—Total expenditure on Medical and Health Services amounted to £19,494 a sum approximating 18 per cent. of the Revenue of the Presidency.

### Virgin Islands (1936)

A cluster of islands to eastward of and adjacent to Porto Rico—the largest in the group belonging to Great Britain is Tortola—which is situated in 18°27'N. latitude and 64°39'W. longitude. The total area of the British Colony (consisting of about 52 islands) is 53 sq. miles.

*Vital Statistics*—The Report under review provides no estimate of the population of these Islands. However registered births are given as 192 and the birth rate 31.1 per 1,000 and deaths 91 with a death rate of 14.7 per 1,000 so the population would have been in the neighbourhood of 8,173.

The infant mortality rate is erroneously stated to be 3.8 per 1,000 population whereas it should be 109.4 per 1,000 registered births for there were 21 infant deaths recorded during 1936.

*Public Health Sanitation etc.*—The general health experience was slightly less favourable than in the preceding year. During a period of prolonged drought in 1936 there occurred an epidemic of acute bacillary dysentery which took its toll among children and old people. The Corporal of Police continues to act as Sanitary Inspector under the

supervision of the Medical Officer his duties were described in the preceding issue of this Supplement (see this *Bulletin* 1937 Supp p 256\*)

*Water Supplies* remain as previously described all are under constant supervision.

The only change recorded in the arrangements made for the disposal of sewage (see this *Bulletin* 1937 Supp p 256\*) is a reference to the provision by Government of two public latrines in the town.

*Hospital Returns etc*—These have particular reference to treatments at the Tortola Cottage Hospital during the year 212 patients were admitted. [The Report erroneously records 112 on p 7 and 5 hospital deaths occurred. Causes of sickness treated included the following—

Though *malaria* admissions numbered the same as last year 19 the disease was less prevalent in the Presidency as a whole Five deaths occurred one among hospital patients

Four cases of *typhoid* were reported two of these were treated as hospital in-patients and one died, the only fatality due to this cause.

*Respiratory ailments* treated in the hospital included nine cases of *pneumonia* with one death four of *broncho-pneumonia* and *bronchitis* with one death and one non-fatal case of *pulmonary tuberculosis*. As regards the latter disease it is observed to be rarely met with except in the Island of Anegada where there seems to be no reason for its existence In the Presidency as a whole 5 deaths were ascribed to *pneumonia* and 4 to *pulmonary tuberculosis* during the year

A widespread epidemic of *influenza* occurred toward the end of the year but only two deaths were recorded as due to this cause and only 5 non fatal hospital cases are mentioned.

*Gastro-intestinal disorders* are perhaps responsible for the largest proportion of hospital patients seeking treatment. The acute *dysentery* already referred to gave rise to 7 non fatal cases but 5 deaths were ascribed to this cause in the Presidency The disease is not ordinarily common but the prolonged drought of 1936 led to an exceptionally low water level in well supplies of water and the bottom dregs were probably stirred up when water was drawn off Other ailments within this group included 5 cases of *gastro-enteritis* with 1 hospital death though 10 deaths due to this cause were registered in the Islands the disorder is a serious cause of sickness among young children due to the effects of dietetic errors Steps are being taken to combat the evils of wrong feeding

*Cardio-vascular ailments* take up almost as much time as do those of the gastro-intestinal tract Only 4 cases were admitted to the hospital but 38 deaths were ascribed to cardio-vascular nephritis causes in the Presidency and these were exclusive of the 10 deaths due to senility

*Maternity cases* seeking admission to the hospital show a steady increase. During the year there were 53 admissions and 52 deliveries without a single maternal or infant death the majority of these mothers were primiparae.

Of *venereal diseases* it is said *syphilis* is extremely rare and *gonorrhoea* "not so common" as in some other islands—only 1 case appears in the *Hospital Returns* (As regards *gonorrhoea*, see this *Bulletin* 1937 Supp p 257\*) *Yaws* was reported to be non-existent except in three members of one family who after treatment were pronounced cured.

Among other diseases treated mention is made of two case of *metallic poisoning* following treatment with "Bisoxyl" with development of gingivitis. In the list of causes of death appear two deaths due to *cancer of the uterus* and one each due to *cancer of the colon* *liver* *rectum* and *throat* respectively.

*Financial*—Under this heading only Hospital Finance is mentioned estimated expenditure being £464 and actual disbursements £413.

## WINDWARD ISLANDS.

### Grenada (1936)

Grenada, the most southerly of the Windward Islands, lies between the parallels of 12°30' and 11°58' latitude and 61°20' and 61°35'W longitude. Its length is 21 miles and greatest breadth 12 miles and its area 133 sq miles or about half that of Middlesex. Trinidad is about 90 miles south of it and St Vincent 68 miles to the north-east, with small islands the Grenadines between them, part attached to the government of Grenada and part to that of St Vincent. Carriacou, the largest, has an area of 8,467 acres.

*Total Statistics*—The estimated population for 1936 is given as 87 105. Registered births numbered 2 786 giving a crude birth rate of 31.9 per 1 000. For some reason no mortality returns are presented in this section but under the heading "Public Health" the crude death rate for the year is given as 16.4 per 1,000. In one place it is stated that "Diseases of early infancy account for no less than 177 deaths. [In England and Wales titles 158-160 in the International List : a "Diseases of Early Infancy" are restricted to children under 1 year of age. The Report under review does not state whether the 177 deaths recorded constitute all infant deaths in 1936.]

*Maternity and Child Welfare Work*—The excellent work which continues to be carried out in the Maternity Wards of the three Hospitals can be summarized as follows—

Hospital	Labour Cases	Maternal Deaths	Infant Deaths
Colony	413	2	4
St Andrew's	101	—	2
Carriacou	69	—	—

At the Colony Hospital the training of probationers in general nursing and midwifery was continued. Each of the 17 Medical Visiting Stations in the out-parishes is staffed by a resident nurse who is also a trained midwife. At these centres 688 confinements were attended, 965 infants visited in their homes and 1 407 general nursing cases dealt with during the year.

The Baby Welfare League continued its activities. A weekly clinic is held at the Colony Hospital, babies are weighed regularly and a trained nurse gives advice on the care and management of children, and also visits children in their homes. Lack of funds greatly restricts the scope and usefulness of the work of the League.

*School Hygiene*—The usual medical inspections of school-children were carried out during the year. Among 18 627 children examined 13 677 were apparently healthy and of the remaining 4 950 children suffering from helminthic infections numbered 1,918 showing dental defects 1 193 skin diseases 823 and enlarged tonsils 445. It is stated that if this work is to be successfully implemented the appointment of a School Medical Officer—preferably a Lady Medical Officer—and provision of accommodation in schools where children can be examined in privacy are desirable. Elementary hygiene is taught in all schools and an Annual Health Week is organized by the Education Department (see this *Bulletin* 1937 Supp. p. 259\*).

*Public Health Sanitation etc*—The state of the public health during 1936 was well maintained. Anti malarial measures continued to be carried out to the limits permitted by available staff and funds. The general method of *sewage disposal scavenging and refuse disposal* remain as previously described (see this *Bulletin* 1937 Supp. p. 259\*). No further pipe-borne *water supplies* were installed during the year. The general condition of the *housing of the poorer classes* is being investigated—overcrowding is common and many of these houses are in a ruinous condition. Regulations for the better control of ice factories milk vendors etc. are being considered by the Sanitary Authority Board. It is said that dietetic deficiencies in the diets of the labouring classes do not appear to be markedly responsible for deficiency diseases the nutritional state of the labouring classes has been specially investigated and results will be embodied in a separate report.

The staff of Sanitary Inspectors continued to carry out their routine duties in all Medical Districts (see this *Bulletin* 1937 Supp. p. 259\*). Sanitary personnel are recruited locally and are trained under the supervision of the Chief Medical and Health Officer and the acting Chief Sanitary Inspector. One candidate was successful in obtaining the Certificate of the Royal Sanitary Institute during 1936.

*Port Health Work*—A number of passengers arriving from South American and Caribbean ports were under surveillance for periods varying from two to fourteen days but no disease under the quarantine regulations gained entry to the Colony during the year. Vaccination and disinfection of baggage were carried out where necessary the latter duties by the District Sanitary Inspector under the supervision of the Port Health Officer.

*Hospitals Dispensaries etc*—The record of the year's work at the three General Hospitals in the Colony is given as follows—

Hospital	Admissions	Treated	Hospital Deaths
Colony	1,804	1,955	88
St. Andrew's	335	301(?)	21
Carnarvon	179	190	3

[It will be noted from the above figures that the numbers of patients treated at St. Andrew's Hospital are fewer than the numbers admitted. Furthermore the figures for all Hospitals differ considerably from those presented in the Hospital Returns in Appendix 3 of the Report viz —

Hospital	Patients Treated	Hospital Deaths
Colony	1 421	89
St. Andrew's	273	21
Carrivacoe	125	3

Also in Appendix 3 under the title *tetanus* appear 9 cases and 4 deaths. Tetanus is unmentioned in the text of the Report and probably these figures are intended to relate to pulmonary tuberculosis in the line below.]

There are also 7 Dispensaries (1 in each District and of these 3 are attached to hospitals) and 17 Medical Visiting Stations in the Out parishes (see *Maternity* above). At the latter centres 6 639 patients were dealt with, an increase of nearly 2,000 by comparison with 1935 records. The Notes which follow summarize the references to the incidence of specific diseases etc. during the year.

*Malaria*—There was a considerable decrease in the numbers of cases reported, viz. 9,827 as against 12,385 in the preceding year though the case fatality rate was higher for 99 deaths were ascribed to the disease in 1936 as compared with 81 in 1935. It may be noted also that malaria accounts for approximately 64 per cent. of the total incidence and 30 per cent. of the mortality due to all infectious diseases reported in Grenada. In view of the marked diminution in malaria morbidity during 1936 the hope is expressed that the anti malarial works undertaken in recent years are beginning to prove effective experience over a period of time can only show whether this hope is well-founded. Anti-malarial work along the lines previously described was continued (see this *Bulletin* 1937 Supp. p. 260-261\*). *Insect borne diseases other than malaria* do not occur though the necessary vectors are present. *Sandflies* are said to be universal and voracious, and it is suggested that an investigation might be undertaken to determine whether a proportion of the numerous cases of fever ascribed to malaria might not in fact be due to sand fly infection.

*Enteric fever* is stated to have been responsible for 31 cases with 6 deaths. Hospital Returns show 34 in-patient cases with 5 deaths. Whether the source or sources of infection were traced is not stated. During the year 2,544 contacts received T.A.B. inoculation. There were 10 cases and 5 deaths ascribed to *dysentery* in no case was diagnosis confirmed bacteriologically. No cases appear to have received in-patient hospital treatment. *Diarrhoea and enteritis* appear to have been more prevalent during the year under review the infection was responsible for the deaths of 147 infants under two years of age.

*Tuberculosis*—An increase both in the incidence and mortality due to *pulmonary tuberculosis* is recorded with 82 notified cases and 82 deaths. The new Consumptive Hospital at Cherry Hill with accommodation for 20 patients was brought into use in October. During the year 38 patients were admitted 50 cases dealt with 4 patients were discharged relieved and 33 died.

*Helminthic Diseases* are confined to *ascariasis* and *ankylostomiasis*—of the former 17 068 cases were recorded, and of *ankylostomiasis*, 3,333. Children are said to be commonly infected and re-infected

with ascariis—according to official returns incidence is highest in No 3 District. Ankylostomiasis is widespread throughout the Colony with the highest incidence in No 1 District. Increased latrine accommodation in schools, villages and rural areas is urgently needed in order to deal effectively with these infections.

*Leprosy*—The disease is not endemic. sufferers are usually found to have contracted the infection in other countries. During the year two cases were admitted to the *Leprosy Settlement* where 14 patients were treated with one death.

*Veneral Diseases*—An increase in the numbers of cases treated is recorded. Cases of syphilis numbered 523 as compared with 368 in the preceding year. of gonorrhoea there were 681 cases under treatment in the Districts and 22 in Hospital making a total of 703 as against 369 during 1935. There was also a very considerable increase in the numbers of patients suffering from *syphilis* who presented themselves for treatment in 1936, 1,399 as compared with 745 in the previous year. The increase is regarded favourably as tending to show that infected persons are more ready to present themselves for treatment than formerly.

*Other references*—Smallpox has been absent from the Island for many years but vaccination is still compulsory and is regularly carried out. No cases of measles or whooping cough occurred and only 44 cases of chickenpox were recorded. A mild variety of influenza was prevalent at times introduced it is believed by visitors from the United Kingdom. According to the Report of the Registrar-General organic disease of the heart (other than V D H) and Bright's disease are two frequent causes of death but in a still large proportion of cases cause of death is ascribed to old age.

*Financial*—Total expenditure on Medical and Sanitary Department Services during 1936 amounted to £21,519 a sum representing 14.3 per cent. of the total revenue of the Colony during the same year.

### St. Lucia (1936)

The Colony of St. Lucia is the largest and most northerly of the Windward Islands in the Lesser Antilles group West Indies. It is 27 miles long and 14 miles broad and has an area of 238 sq miles or slightly larger than the Isle of Man.

*Vital Statistics*—The population of the Colony in 1936 was estimated to number 66,230. Registered births totalled 2,125 and deaths 988 the resulting birth and death rates being 32.1 and 14.9 respectively. Infant deaths numbered 208 giving an infant mortality rate of 97.9 per 1,000 live births.

*Maternity and Child Welfare Work*—The Maternity and Child Welfare Centre in Castries, staffed by voluntary workers, functioned with marked success throughout the year. Government Medical Officers also gave their services voluntarily as formerly. During the year 481 new cases of infants and children were seen, 2,061 home visits were made, 56 expectant mothers were examined and 73 confinements were attended. Owing to lack of local enthusiasm the centre in Soufrière did not function during the year but arrangements are

being made for the establishment of a centre at Denney. Admissions to the Maternity Ward of the Victoria Hospital numbered 675. 549 babies were born and only a single maternal death was recorded.

*School Hygiene*—Government Medical Officers and Sanitary Inspectors regularly examine school premises the Managers of which are allowed a small Government subsidy for the purpose of maintaining schools in a sanitary condition. The only mention of medical examination of school-children occurs in the Report of the Medical Officer No 5 District who speaks of the inspection of school-children for evidence of skin diseases.

*Public Health Sanitation etc*—No epidemic outbreaks were recorded during the year. The state of the public health is stated to have been satisfactory. Methods of *sewage disposal* and *scavenging* remain unchanged (see this *Bulletin* 1936 Supp p 253\*). Owing to the prevalence of malaria the question of drainage receives special attention and efforts were made to carry out permanent works in various areas. With regard to *water supplies* references are meagre. It is said that "chlorination will most probably be resorted to in an effort to improve the water supply in Castries and that in No 5 District "a regular and adequate supply of very good water has been available throughout the year. The Senior Sanitary Inspector contributes a detailed statement of the work carried out in the Sanitary Districts. He reports that frequent examination of samples of milk water and foodstuffs were made premises used for the manufacture and sale of foods of various kinds were inspected, estates visited and their sanitary condition reported upon etc. A statistical summary of all these activities is appended.

*Port Health Work*—During the year 50 ships entered Castries port. It was not found necessary to impose quarantine restrictions on any of the ports from which vessels arrived.

*Hospitals Dispensaries etc*—Considerable improvements both as regards the buildings and equipment were effected during the year at the Victoria Hospital. In-patients treated totalled 2,805 and 121 hospital deaths were recorded. The notes which follow briefly summarize the commentaries in the Report on the principal diseases treated in the Colony during 1936.

As usual *malaria* figures high among the causes of ill-health. During the year 3,404 cases were dealt with at all treatment centres. It is of interest to note that in Castries, where approximately one-third of the total population of the Colony are to be found, only 579 cases were recorded, evidencing the beneficial results of the intensive anti-malarial measures applied in the area. At the Victoria Hospital 91 in-patients were treated for the disease and 4 died. 63 of these cases were *tubercular* infections but in the remaining 28 the type of infection was not defined. One non-fatal case of blackwater fever appears in the Hospital Returns. In the Colony as a whole 88 of the registered deaths were ascribed to malaria. At the Laboratory where 198 blood films were examined for the presence of malaria parasites, 49 contained *P. falciparum* 6 *P. vivax* and 5 *P. malariae*.

Anti-malarial work received special attention, and the efforts to abate mosquito breeding were vigorously continued. Mosquito larvae collected from various localities and identified at the Laboratory included 121 *A. tritaeniatulus* and 97 *A. argyritarsis*.

There was an increase in the incidence of *enteric fever* in the second quarter of the year but the disease never assumed epidemic proportions. 42 cases were notified. Cases were sporadic and reported from various parts of the Island usually the source of infection could not be traced. Early notification hospitalization and T.A.B. inoculation of all contacts proved highly successful in preventing spread of the disease. At the Victoria Hospital 40 patients were dealt with and 16 died. No cases of *amoebic dysentery* were reported but one case of *bacillary dysentery* received in patient hospital treatment.

Of *pulmonary tuberculosis* 50 cases were notified during the year and 56 deaths were ascribed to this cause in the Colony as a whole. Of the disease the Medical Officer No 1 District says "I feel certain that this disease is more prevalent than our statistics reveal" while his colleague in No 2 Medical District reports "a slight reduction in the number of cases." At the Victoria Hospital where 23 patients were treated for all forms of tuberculosis 16 were suffering from the pulmonary form of the disease and 2 died. At the Laboratory 5 out of 47 specimens of sputum examined were positive with *Mycobacterium tuberculosis*. Prominent among other respiratory affections are *bronchial troubles* and *asthma*.

*Helminthic diseases* still maintain their high incidence. Quoting from the reports of District Medical Officers it is stated that in No 1 District round worm infections predominate but there was an increase in the numbers of cases of ankylostomal infection. In No 2 District ascariasis predominated. In No 3 District among the alimentary disorders due to metazoan parasites 35 of ankylostomiasis and 32 of bilharzia were met with. In No 4 District helminths are chiefly round and thread worms and in a few cases hookworms. While in No 5 District of alimentary disorders it is recorded that the real cause of the trouble was either ascariasis or ankylostomiasis mainly in young children.

In the Colony as a whole 6 496 patients were treated for helminthic infections. At the Laboratory where 709 faecal specimens were examined, 45 per cent. contained ankylostome and ascaris and 63 per cent. trichuris ova (multiple infestations).

*Venereal diseases* are said to maintain their prominent position as causes of disability though treatment is more readily sought than formerly. Turning to Reports of District Medical Officers again in No 1 District it is said that congenital syphilis was much more in evidence than in recent years and a larger number of primary chancres was also seen while gonorrhoea continued rampantly on its work of destruction. In No 4 District syphilis and gonorrhoea rank very high amongst the diseases in the District. Referring to the large number of cases in No 5 District it is explained "the apparent increase is due to the fact that people are gradually recognizing the potency of the drugs which are available free of charge." Altogether 764 cases of syphilis and 880 cases of gonorrhoea were reported from all the Districts while chancroid is said to be very prevalent. The V.D. Clinic at Castries continues to perform invaluable work. 263 cases of syphilis and 79 of gonorrhoea were seen and treated.

Though a reduction in the number of cases of yaws is reported, incidence is still high. During the year 1 010 cases were seen and treated, Bhoxy yielding excellent results.



To the *Lepet Asylum* 8 patients were admitted and 3 died, leaving 27 inmates on the books at the end of the year. Though no cases proved fit to be discharged three "closed" cases are under observation.

*Other diseases*—It is noted that no less than 84 deaths were ascribed to diseases of nutrition. In this connection it is observed with what frequency District Medical Officers comment upon unsuitable dietaries, largely due to ignorance and poverty among the lower classes. *Ulcers* in relatively large numbers are treated—no less than 383 cases were dealt with at the Castries Dispensary alone—the majority the result of neglect of personal hygiene.

*Scientific*—At the Laboratory 1,365 specimens were received, examined and reported upon. The more important of these and the findings recorded have already been the subject of mention under various headings in the preceding notes.

*Financial*—Total expenditure on Medical Department services during 1936 amounted to £10,734 as against an approved estimated expenditure of £11,245. Actual expenditure represented 13.2 per cent of the total expenditure of the Colony in 1936.

### St. Vincent (1936)

The West Indian Colony of St. Vincent includes the Island of St. Vincent, the second largest of the Windward Islands and five of the *Lesser Grenadines*, a chain of islands lying between Grenada and St. Vincent. The island of St. Vincent is 18 miles long and 11 miles broad and has an area of 133 sq miles or nearly that of the Isle of Wight; the total area of the five smaller islands is some 17.3 sq miles.

*Isal Statistics*—The estimated population is given as 58,511 representing an increase of 2.3 per cent. over the 1935 figure. Registered births numbered 2,212 giving a crude birth rate of 39.1 per 1,000 approximately 70 per cent of the total live births were registered as legitimate. *Stillbirths* numbered 110. Registered deaths totalled 924 and the crude death rate was 16.4 per 1,000. *Infant deaths* numbered 264 giving an Infant Mortality Rate of 119.3 per 1,000 live births.

*Maternity and Child Welfare Work*—At the Colonial Hospital, Kingstown, 287 normal confinements were conducted, 285 babies were born alive and 51 abnormal cases of labour were dealt with. At the Chateaubelair Hospital normal labour cases numbered 14. In the Districts Government Nurses attended 169 midwifery cases gave advice and assistance to 483 expectant mothers and made 12,625 visits to the homes of mothers and children. A small Infant Welfare Centre was started in April at the Colonial Hospital, and to the end of the year 197 attendances were recorded, and a further 97 attendances were registered at the small ante-natal clinic which is held weekly at the Hospital. In view of the steady increase in the infant mortality rate and in the death rate of children aged 1-5 years since 1933 it is proposed to appoint a specially trained nurse to co-ordinate and supervise all infant welfare work.

*School Hygiene*—There are 37 schools in the Colony and approximately 11,400 pupils on the school registers but only about 57 per cent. of them attend regularly. During the period

Medical Officers 5 040 pupils were seen and the resulting records show 4.2 per cent suffered from different forms of glandular enlargement 2.5 per cent from skin diseases and only 0.6 per cent from yaws. It is said that children infected with yaws remain away from school and thus are rarely seen. The practice of making visits to schools at quarterly intervals by Medical Officers is to be abandoned and half yearly visits will in future be made. It is hoped the new arrangement will permit of more time being devoted to the examination of the children during the visits.

*Public Health Sanitation etc*—There was no change in the system of *sewage disposal* in Kingstown, described in previous issues of this Supplement. The unsavoury bucket system still exists though further applications continue to be made for septic tank installations of which there are now 92 in the Kingstown area. The question of the adequacy of the Kingstown *water supply* received the consideration of the Town Board and steps are being taken to obtain additional sources of supply. With regard to other areas it is noted that proposals have been submitted for the improvement of existing supplies in six areas and for the provision of satisfactory and adequate supplies in four other areas. Conditions of *housing* amongst labourers are said to be bad but until employment can be made more stable little improvement in living conditions can be expected. Persons engaged in the preparation and sale of *food* were medically examined at intervals and the Sanitary Staff continued to visit and inspect the premises of food vendors etc. details of the actual work carried out are presented in a series of Tables in the Appendix to the Report under review. A course of training for Sanitary Inspectors is to be held early in 1937.

*Port Health Work*—Ports not coming within the scope of the International Sanitary Convention were subjected to certain restrictions and port restrictions were also imposed upon passengers landing at Kingstown from a neighbouring port (unnamed) where a case of smallpox had occurred. Arrivals at Kingstown during the year totalled 2 568 and departures 2,564.

*Hospitals Dispensaries etc*—The established Hospitals include the Colonial Hospital Kingstown the District Hospitals at Georgetown and Chateaubelair the Tuberculosis Sanatorium the Mental Hospital and Pauper Asylum. A new block approaches completion in the grounds of the Colonial Hospital this will house the radiological clinic provided and equipped solely through the munificence of Henry HAYWARD Esq and a bacteriological laboratory the cost of this building also being contributed by Mr Hayward.

Details concerning patients treated at these Institutions read as follows —

Institution	Patients Admitted	Total In-patients	Hospital Deaths	Out patients Treated
Colonial Hospital	1 452	1,518	95	3,847 (attendances)
Georgetown Hospital	95	98	3	?
Chateaubelair Hospital	88	88	4	?
Tuberculosis Sanatorium	10	15	8	—
Mental Hospital	26	83	7	—
Pauper Asylum	18	80	13	—

In connexion with the Colonial Hospital records it may be noted that no correction is made for the residence of patients many of whom are domiciled outside the Kingstown area.

The *Dispensaries* continued to function as previously described (see this *Bulletin* 1937 Supp p 266\*) At these centres attendances for treatment totalled 49 429

At the Colonial Hospital training of the subordinate staff was carried out by the Resident Surgeon and Matron Two nurses completed their training and qualified and four probationers commenced the three years course The training of Dispensers now follows a considerably extended scheme of work with a view to increasing the scope and usefulness of these officials

Reliable medico-statistical records are now maintained and their analysis will ensure the presentation of a more dependable picture of the state of the public health each year Among other items of morbidity experience commented upon occur the following —

There were fewer cases and deaths ascribed to *malaria* namely 953 cases with 2 deaths as compared with 1 452 cases and 12 deaths in the preceding year It may be noted that 43 per cent of the total cases were notified from certain areas in District 2 South (see this *Bulletin* 1937 Supp p 266\*) Necessary action was taken by the application of anti-malaria measures. Of the total cases recorded, 23 only appear to have received in-patient hospital treatment, 20 were *subtertian* infections treated at the Colonial Hospital and in the remaining 3 dealt with at the Chateaubelair Hospital the type of infection was not determined

Only 20 cases of *enteric fever* (with 10 deaths however) were recorded as against 57 cases (1935 Report gave 54) and 13 deaths in 1935 All were dealt with at the Colonial Hospital the high case mortality indicating that many patients did not seek admission until the disease had reached an advanced stage 4 patients died within 24 hours of admission The occurrence of cases was entirely sporadic—only one case was reported from the area in which cases predominated in 1935 Special attention was devoted to the question of carriers and to possible sources of infection 587 contacts were inoculated. All diagnoses were on clinical evidence only Of *dysentery* two cases were notified the type of infection was not differentiated. There were also 1 641 cases of *diarrhoea and enteritis* with 108 deaths. *Tuberculosis* (all forms) was responsible for 53 cases with 27 deaths and of the total cases recorded, 40 were due to the *pulmonary* form of the disease with 25 deaths the majority of these from urban areas. [Some confusion characterizes statements in different parts of the Report. For example —

(a) On page 7 it is stated 14 cases were admitted either to Hospital or the Sanatorium But Table 18 records 13 cases of pulmonary tuberculosis admitted to the Colonial Hospital, and 10 were admitted to the Sanatorium—a total of 23

(b) Page 7 records 11 deaths among those admitted for treatment "but Table 18 records 5 deaths in the Colonial Hospital and at the Sanatorium 8 deaths occurred—a total of 13.

(c) Table 5 records 24 cases of pulmonary tuberculosis but on page 7 we are told there were 40 such cases.]

Among other *respiratory diseases* are mentioned 52 cases of *pneumonia* with 30 deaths [in another place 39 deaths are ascribed to this cause] *bronchitis* 1 731 cases and 41 deaths *other diseases of the respiratory system* (ex *tuberculosis*) 1,364 cases 10 deaths

*Influenza* occurred throughout the year in a mild form 677 cases with one death being notified. About 67 per cent of the cases occurred in the District of Kingstown and the Grenadines. Only 4 non fatal cases of *whooping cough* and two non fatal cases of *measles* occurred during the year under review

*Veneral Diseases*—Various forms of *syphilis* gave rise to 752 cases with 40 deaths while of *gonorrhoea* 631 cases and one death were recorded. With regard to *gonorrhoea* all District Medical Officers report that early infections are rarely seen and that patients do not continue treatment to cure for venereal infections. A V D Clinic is to be established at the Colonial Hospital Kingstown and this together with an intensive propaganda campaign may serve to ameliorate existing conditions. Of years 5 431 cases were recorded and injections totalled 16,854. Treatment by former methods was continued but patients do not attend until the disease is well advanced and even then attendances are irregular. Insanitary housing conditions and malnutrition combine to retard progress to cure.

To the *Leper Settlement* two cases of advanced type were admitted during the year and there was a daily average of patients of 18 with one death. Treatment followed the usual recognized lines with results said to be disappointing. The dietary of inmates received special attention and the proposal for the removal of the Settlement again came up for consideration but no definite conclusions were reached.

*Other items of medical interest* referred to in the Report include the following —

Twelve cases of *tetanus* were admitted to the Colonial Hospital and five of these patients died in addition four cases of *tetanus neonatorum* were reported—two of doubtful authenticity. Diseases associated with *malnutrition* predominated among hospital admissions while *ulcers* many of them extensive and chronic were numerous. At the *Eye Clinic* new cases totalled 403 and attendances 503 school-children comprised 26 per cent of the total. *Helminthic diseases* are not commented upon though the returns record 9 092 cases of *ascariasis* and 372 due to other diseases caused by helminths

*Financial*—Medical Department expenditure during 1936 amounted to £14 777. Expenditure against revenue (19.5 per cent of estimated revenue) appears high for the revenue of the Colony stands at a comparatively low figure.

## TRINIDAD AND TOBAGO (1936)

Trinidad (area 1,864 sq miles) is the most southerly of the West Indian Islands lying about 16 miles off the coast of Venezuela in latitude 10°N. Tobago (area 116 sq miles) is some 21 miles north-east of Trinidad.

*Vital Statistics*—The total population of the Colony at the end of the year as estimated by the Registrar General was 448,253 included in the total is the estimated population of the Island of Tobago 17,570 [It is clear that birth and death rates are calculated on a mid year estimate (not supped) of 444,114] Registered births totalled 14,625 and deaths 7,230 giving crude birth and death rates of 32.63 and 16.28 per 1,000 respectively. The Infant Mortality Rate of 96.8 per 1,000 births establishes a new low record for the Colony.

*Maternity and Child Welfare Work*—At the Colonial Hospital Port-of Spain 1,298 new cases attended the Ante-Natal Clinic 738 of these were admitted to the maternity ward and 474 confinements were dealt with by district maternity nurses in the homes of patients. At the Colonial Hospital, San Fernando 750 new cases attended the Ante-Natal Clinic, 384 were admitted to the maternity ward and 92 confinements were conducted by hospital district nurses. At the Colonial Hospital, Tobago 280 expectant mothers were admitted and confinements were normal in 180 cases.

The fact that 657 of the maternity cases admitted to the Colonial Hospital, Port-of Spain were normal and without mortality suggests that development of the district maternity service would greatly relieve the congestion of maternity wards and leave more beds available for abnormal cases.

At the Nurses Training Schools at Port-of Spain and San Fernando eight nurses were successful at the midwifery examination.

*The Child Welfare League* (a purely voluntary organization) reports another year's successful work. An additional branch was opened in Port-of Spain, a new clinic at Point Fortin, and a branch at the Kern Trinidad Oilfields. There are now 14 district branches and 20 clinic centres. Certain oil mining companies are taking interest in maternity and child welfare services and a number of the sugar estates provide crèches for the children of mothers. On one small estate a trained nurse is employed, a monthly clinic for sick children is held, and regular visits are paid to the homes of the labourers.

*School Hygiene*—The medical inspection of school-children was carried out by part time School Medical Officers. During the year 5,253 children attending 23 schools were examined and 3,860 showed defects of one kind or another. Most of the children were found to have several defects each dental caries, enlarged tonsils cervical glands under-nourishment, figuring prominently in the findings. Defects chiefly occurred between the ages of 6 and 12. Lectures on hygiene were given by teachers to their pupils and hygiene classes for teachers in training were conducted by Medical Officers. The teaching of mothercraft in schools together with health lectures and demonstrations were features of the work of the Child Welfare League.

A scheme for the provision of two whole-time School Medical Officers has received approval. These will form the nucleus of a School Medical Service.

*Public Health Sanitation etc*—Changes in the organization of the Department are described at some length (see also this *Bulletin* 1936 Supp p 258\* and 1937 Supp p 268\*-269\*) Certain departures from the policy outlined in the Report of the Medical Reorganization Committee (Council Paper No 66 1934) received the approval of Government provision has been made for these changes in the 1937 estimates The establishment of the Department was increased by the inclusion of the following posts —To the Colonial Hospital Port-of Spain a Medical Superintendent three Junior Contract Medical Officers one Superintendent Sister Colonial Hospital, San Fernando one Junior Contract Medical Officer one Superintendent Sister Other additions included two Chief Sanitary Inspectors two Sanitary Inspectors three clerks. Certain appointments have been re-named, among them the title of Surgeon-General has been changed to that of Director of Medical Services and his Deputy will be known as the Deputy Director of Medical Services

The general health of both Trinidad and Tobago remained satisfactory during the year under review

Anti-malarial measures undertaken included the construction of major and minor works of permanent character the reclamation of swampy and low-lying lands drainage schemes and malaria surveys in various areas.

Methods of *sewage disposal* remain largely as previously described in these pages (see this *Bulletin* 1935 Supp p 259\* 1936 Supp p 259\* and 1937 Supp p 269\*) Despite the very limited funds at the disposal of local authorities progress in rural sanitation can be recorded the construction of latrines in rural areas presents considerable difficulties but these are gradually being overcome with the assistance of certain estates.

The *Central Water Supply Scheme* was brought into use in March (see this *Bulletin* 1937 Supp p 269\*) and by the end of the year a large part of the populated areas of the northern division was supplied from this source. The results of bacteriological and chemical analyses leave nothing to be desired. In general the southern division has less good water than the northern, where the ramifications of the central scheme are more widespread. Outside the areas served by the Central scheme supplies are obtained from springs public and private water holes etc. Some of these after treatment supply good potable water but untreated supplies are regarded as unsafe.

With regard to *housing and town planning* clearance of slum areas was carried out by the City Council of Port-of Spain and a number of workers cottages erected. In rural areas progress in housing improvement is reported the example of the more progressive oilfields is being followed by estate owners and cottages are gradually replacing the old type of barracks accommodation The appointment of a Town Planning Adviser has been approved by Government.

The usual inspection and control of *foodstuffs* continued to be carried out Progress in the establishment of markets is reported. General sanitary conditions of slaughterhouses etc. were well maintained The standard of the numerous small dairies is improving slowly A standing *Nutrition Committee* representative of Agriculture Health Education, and Estates was appointed towards the end of the year to enquire into the malnutrition of certain sections of the Trinidad population.